

# FRANCE-BERKELEY FUND



ANNUAL REPORT

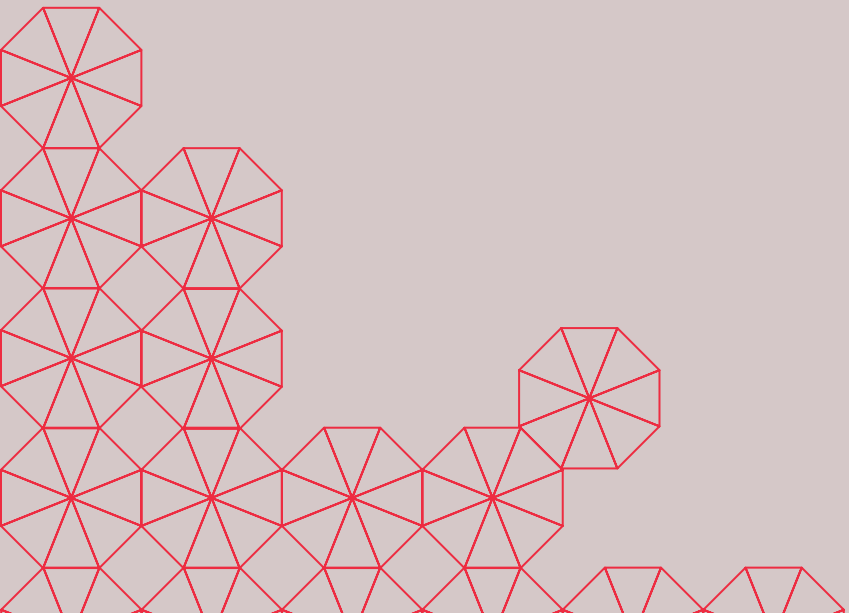




## Mission and Vision

Established in 1993 as a partnership with the French Ministry of Foreign Affairs, the France-Berkeley Fund (FBF) promotes and supports scholarly exchange in all disciplines between faculty and research scientists at the University of California and their counterparts in France.

Through its annual grant competition, the FBF provides seed money for innovative, bi-national collaborations. The Fund's core mission is to advance research of the highest caliber, to foster interdisciplinary inquiry, to encourage new partnerships, and to promote lasting institutional and intellectual cooperation between France and the United States.



## FRANCE-BERKELEY FUND

203 Moses Hall #2316  
University of California, Berkeley  
Berkeley, CA 94720

## MINISTÈRE DE L'ENSEIGNEMENT SUPÉRIEUR, DE LA RECHERCHE ET DE L'INNOVATION (MESRI)

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the United States

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Professor Emeritus of Political Science;  
Former Associate Vice Chancellor for  
Research, UC Berkeley

### EXECUTIVE DIRECTORS

#### **Larry M. Hyman**

Professor of Linguistics  
UC Berkeley

#### **Clément Sanchez**

Professor of Physics  
Collège de France

### PROGRAM MANAGER

#### **Julia Nelsen PhD**

UC Berkeley

## Celebrating 25 years of collaborative research

In the Spring of 1993, the French Ministry of Foreign Affairs came to Berkeley with an ambitious idea: to endow collaborative research and scholarly exchanges between a campus and a country. The resulting grant program launched the following year has more than fulfilled the hopes and expectations that led to the original agreement. Since its inaugural cohort, the France-Berkeley Fund has achieved remarkable results: 484 sponsored projects engaging Berkeley researchers in all disciplines with their counterparts at 150 institutes, laboratories, and universities across France.

The France-Berkeley partnership—the first of its kind—has inspired offshoots at prestigious universities throughout the United States. Each year, we hear from our colleagues at the French Embassy in Washington that the FBF is recognized as the jewel among its international education agreements, for the breadth and excellence of the projects funded. This year is no different. Our new collaborations span an impressive range of research topics across the STEM fields, humanities, and social sciences—from new approaches to flood risk management, to cultural histories of algebraic language and the algorithm; from advanced seismic imaging techniques, to demographic comparisons of life expectancy in France vs. the U.S.; from tracing the evolution of Hawaiian wolf spiders, to mapping the dark matter of the universe since the Big Bang.

Underlying these different approaches and areas of expertise are the FBF's priorities to support and advance early career researchers, and to foster new linkages that will ensure continued bi-national cooperation. As our grantees consistently report, their projects have generated a great number of joint publications, conferences, workshops, and innovative research tools, while providing leverage for further major funding at the national and international level. In addition, collaborations enable long-lasting relationships and expansive networks between the hundreds of participants involved - over 300 Berkeley professors and 600 students in France and California. With a relatively modest investment, FBF seed funds truly keep on giving.

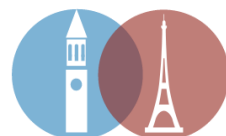
The Fund's success is due in no small part to its supporters, above all the French Ministry of Higher Education and Research and the Berkeley Office of the Vice-Chancellor for Research, whose annual subsidies make our work possible. Sincere thanks go to the many reviewers on both sides of the Atlantic who generously lent their time and expertise to evaluating 60+ proposals, and to the members of our Executive Committee for their energy and engagement. This year, we extend special gratitude to our outgoing colleagues at the French Consulate, Philippe Perez (Attaché for Science and Technology), Mar Roig-Ripoll (Higher Education Officer), and Jean Charconnet (Attaché de Cooperation Pour le Français), and wish them the best in their next endeavors. As in past years, we offer warmest thanks to Minh-Hà Pham for her ongoing support, and welcome her replacement, Scientific Counselor Yves Frénot, with whom we will continue to shape the program's strategic vision over the next several years.

Looking ahead to the next 25 years and beyond, the France-Berkeley Fund will continue to exemplify a model of international cooperation in the public university of the future. A key priority is to bolster engagement with partners in the private sector. At the same time, we aim to increase resources for bi-national research in the arts and humanities, in alignment with our core mission to foster dialogue and expand our understanding of the global community. Across all disciplines, the FBF remains driven in its commitment to forge shared pathways to innovation, enabling researchers to think and work collaboratively to address the big questions and grand challenges of our current moment, and those of tomorrow.

Sincerely,

**Larry M. Hyman and Clément Sanchez**  
Executive Directors

**Julia Nelsen**  
Program Manager



# FBBF **at a glance**

**25** years

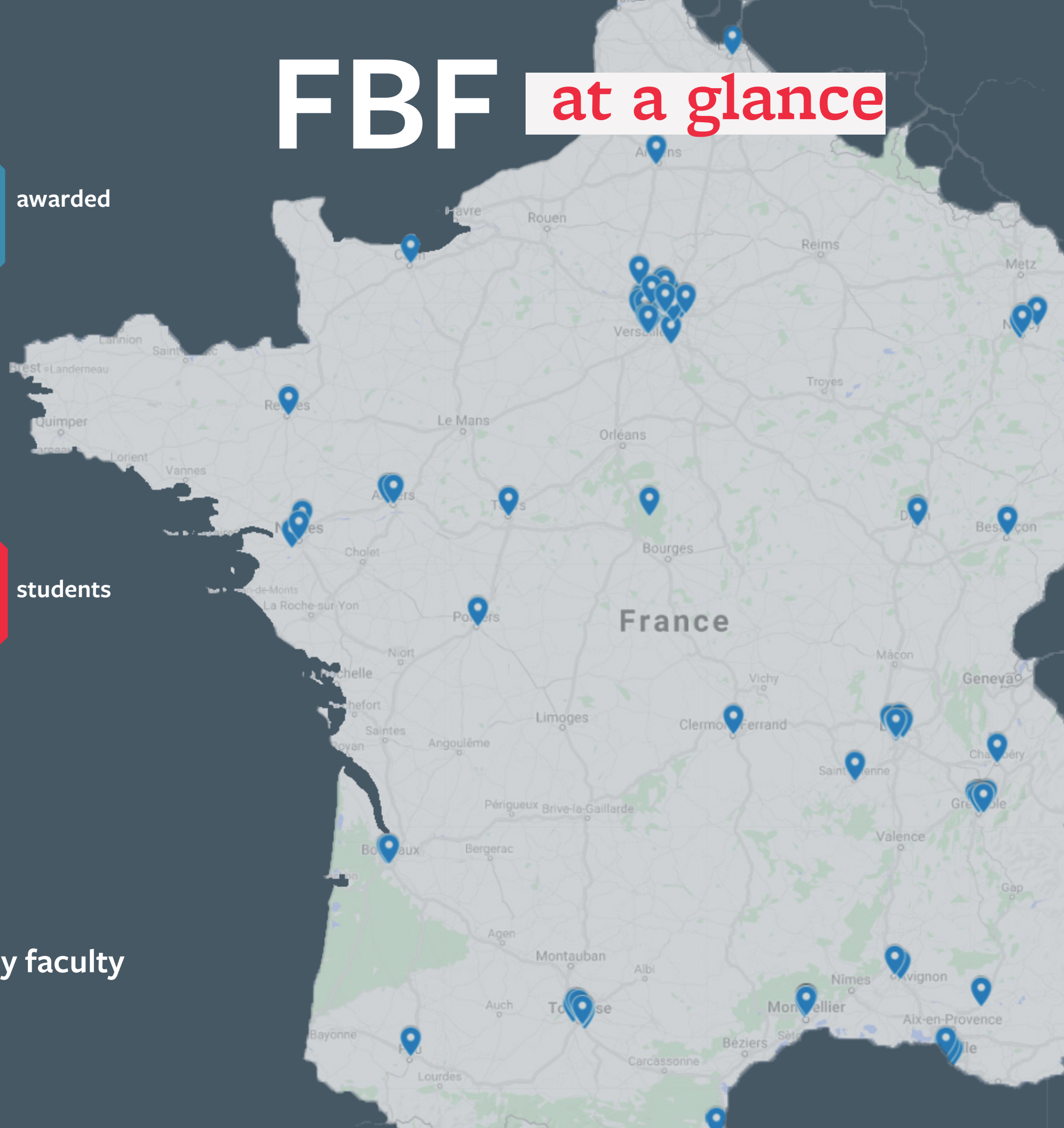
**\$4.5M** awarded

**484** collaborations

**650** students

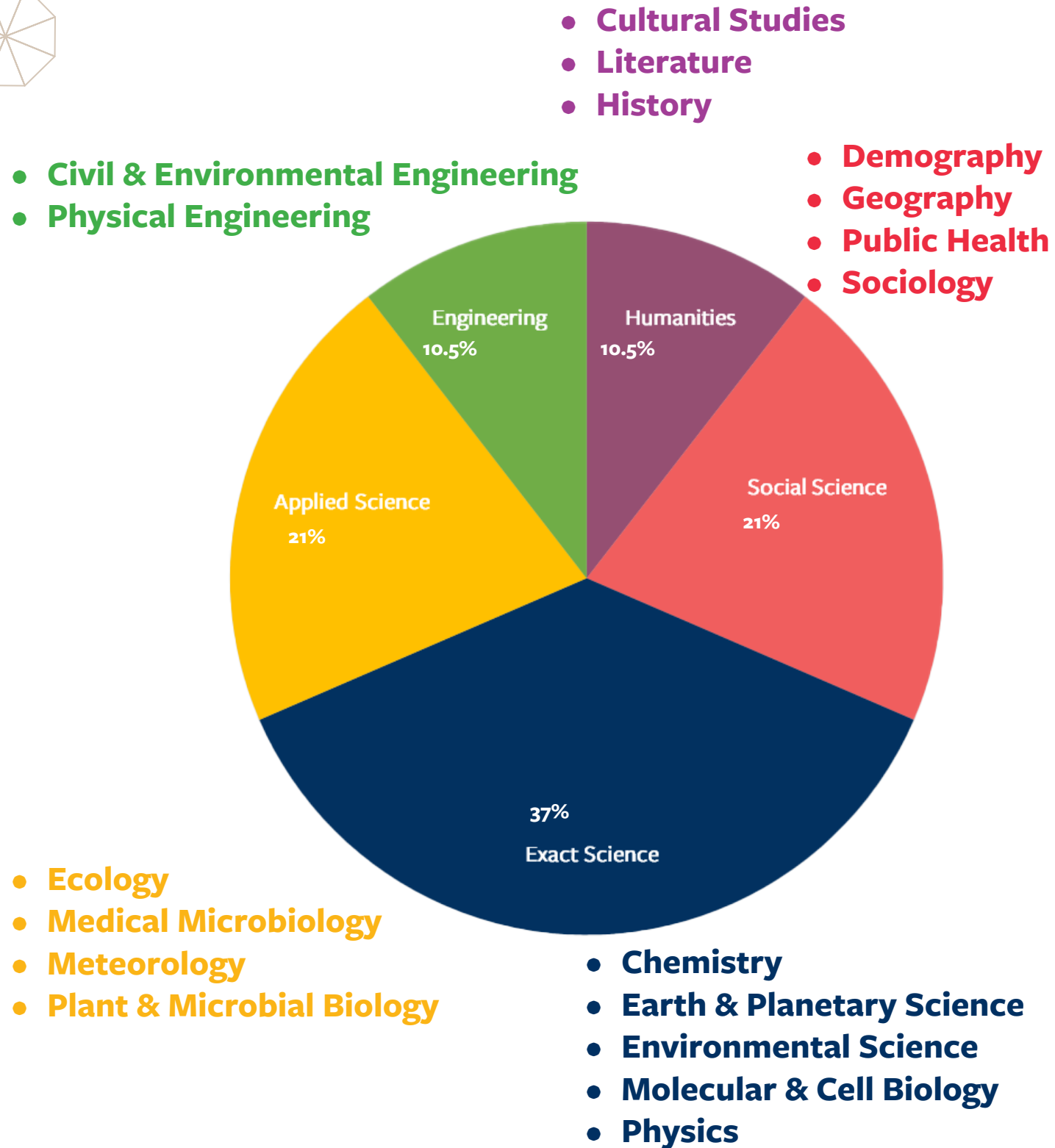
**150** French institutions

**340** Berkeley faculty



# NEW COLLABORATIONS

The FBF is pleased to sponsor **19 outstanding projects** in 2019-20, with awards totaling **\$184,020**



FUNDED PROJECTS BY AREA OF RESEARCH, 2019-20

**Andreas BÄUMLER**, Medical Microbiology and Immunology, UC Davis  
**Simon LABARTHE**, MaIAGE (MIA), INRA, Centre de Jouy-en-Josas

### EXPERIMENTAL AND MATHEMATICAL MODELS ARTICULATION: A BIFOCAL LENS TO STUDY THE ECOLOGY OF THE COLON MICROBIOTA

The gut microbiota provides number of beneficial functions to its host, including nutrition, immune system regulation and niche protection against pathogens; in return, the host shapes the environment to ensure commensal bacteria provide benefit. To maintain this symbiotic interaction at the organ scale, a myriad of microscale interactions occur, between bacteria, or between the host and the microbiota. Data at different scale and resolution must be articulated to decipher these regulation mechanisms. We aim to build an appropriate multidisciplinary methodology, gathering mathematical and experimental models, to enhance data integration and identify new mechanisms involved in gut microbiota regulation.



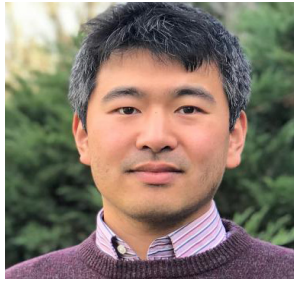
APPLIED SCIENCE

**Ksenia KRASILEVA**, Department of Plant and Microbial Biology, UC Berkeley  
**Thomas KROJ**, INRA, Montpellier

### BIOINFORMATIC IDENTIFICATION AND FUNCTIONAL ANALYSIS OF DISEASE RESISTANCE AND SUSCEPTIBILITY GENES TO FUNGAL DISEASES IN WHEAT AND RICE

This project will address fundamental questions on the function, diversity and evolution of plant NLRs (nucleotide-binding and leucine-rich repeat domain proteins) that are an important class of immune receptors and the main class of genes employed in crop disease resistance breeding. This collaboration will result in exchange of expertise and joint development of standardized protocols for functional and comparative genomic investigation of NLRs.

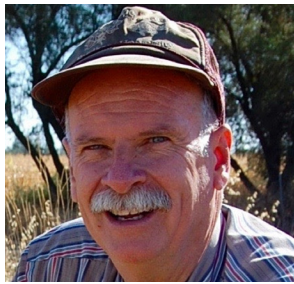




**Da YANG**, Department of Land, Air and Water Resources, UC Davis  
**Caroline MULLER**, Laboratoire de Météorologie Dynamique, Ecole Normale Supérieure de Paris

**UNDERSTANDING CONVECTIVE ORGANIZATION IN THE TROPICAL ATMOSPHERE**

This project aims at advancing our fundamental understanding of atmospheric deep convection (thunderstorms) and its spatial organization, which is a grand challenge in climate science. The success of this project will help guide and improve representations of organized convection in climate models, which would make more reliable projections about extreme precipitation events in future climates.



**Truman YOUNG**, Department of Plant Sciences, UC Davis  
**Elise BUISSON**, Institut Méditerranéen de Biodiversité et d'Ecologie, Avignon Université

**TAKING PRIORITY EFFECTS INTO ACCOUNT IN RESTORATION AND INVASIVE SPECIES CONTROL FIELD EXPERIMENTS**

This collaboration will coordinate ideas concerning the role of priority effects and other ecological contingencies in ecology and restoration, in view of writing up several papers and developing longer-term research relationships, including reciprocal trips to Avignon University.



**Edgar KNOBLOCH**, Department of Physics, UC Berkeley  
**Benjamin FAVIER**, Institut de Recherche sur les Phénomènes Hors Équilibre - CNRS, Aix-Marseille Université

**LARGE-SCALE STRUCTURES IN ANISOTROPIC TURBULENCE**

This project deals with the formation of large scale coherent structures in anisotropic turbulent flows. The main objective is to better understand the physical mechanisms at play in geophysical and astrophysical flows. The project will combine theoretical, numerical and experimental approaches to characterize non-local interactions between small-scale turbulence and large scale vortices frequently found in such flows.



**Nicholas SITAR**, Department of Civil & Environmental Engineering, UC Berkeley  
**Cino VIGGIANI**, Laboratoire 3SR, Université Grenoble Alpes

**CHARACTERIZATION OF DEPOSITIONAL FABRIC OF SANDS USING 3-D X-RAY COMPUTED TOMOGRAPHY (3-D XRCT)**

The objective of this project is to initiate a cooperative effort to examine the fabric of natural granular deposits, sands in particular. The study of the influence of depositional structure of granular deposits has been Sitar's long-term research interest. However, until recently, there were no practical methods for obtaining high resolution images of the actual 3-D structure of undisturbed samples.



**Massimo MAZZOTTI**, Center for Science, Technology, Medicine & Society / Department of History, UC Berkeley  
**Giovanna CIFOLETTI**, Centre Alexandre-Koyré, EHESS, Paris

**ALGEBRAIC LANGUAGE AND THE ALGORITHM: ART OF THINKING, THINKING MACHINES, AND MACHINE THINKING**

The pervasiveness and relative invisibility of algorithms in our social and scientific life raise urgent questions and reveal new challenges. We investigate today's technological and social transformations from a historical perspective, tracing a genealogy of "algorithmic thinking" back to the European Renaissance to identify technical and semantic continuities, discontinuities, and breaks with current debates on automation and its effects. We employ methods and questions from the humanities and the social sciences, in order to explore the social, epistemological, and ethical implications of emerging technologies.



**Elizabeth ABEL**, Department of English, UC Berkeley  
**Claire DAVISON**, Université Sorbonne Nouvelle - Paris 3

**SOUND WAVES: VIRGINIA WOOLF'S RESONANCE**

Our project brings together French and American scholars of Virginia Woolf to explore the resonance of her work across the boundaries of language, history, medium, and nation. We join the current surge of critical interest in what are often called "sound studies" and that Woolf called the "waves in the mind" that reverberate below the frequencies of semantic specificity. In addition to deepening our understanding of Woolf's "auditory imagination" (a phrase we borrow from her friend T.S. Eliot), we seek to gain a better understanding of the formal and philosophical porosity of sound and the intimate connections between avant-garde radiophonic experimentation and modernist aesthetics.



HUMANITIES

ENGINEERING



**Magali BARBIERI**, Department of Demography, UC Berkeley  
**Hippolyte D'ALBIS**, Paris School of Economics

**GEOGRAPHIC VARIATIONS IN THE LENGTH OF LIFE: COMPARING FRANCE AND THE UNITED STATES**

In the current context of increasing disparities in mortality within the most developed countries and given the growing divergence in trends at the national level between the United States and other high-income countries, the purpose of the proposed project is dual. First, we will build two databases of historical mortality indicators at the regional level in France (for the départements) and in the United States (for the counties) using the same set of methods. Then, we will use the resulting data series to compare the levels and trends in geographic inequalities in the length of life and their role in the increasing divergence in life expectancy at birth at the national level between the two countries.



**Brenda ESKENAZI**, Center for Environmental Research & Children's Health, UC Berkeley School of Public Health  
**Rémy SLAMA**, CNRS, Université Grenoble Alpes

**THE IMPACT OF THE PREGNANCY EXPOSOME ON BIRTH OUTCOMES**

Studying the impact of the entirety of environmental exposures (the “exposome”) on health is a real challenge. This collaboration will gather the exposome experts from multiple research fields. Based on this expertise, simulations and both US and European mother-child cohorts, we aim to investigate, using new methodologies, the effects of the environmental exposures occurring during the prenatal period, a key time for health and the development of child and adult diseases.



**Claude FISCHER**, Department of Sociology, UC Berkeley  
**Guillaume FAVRE**, Laboratoire Interdisciplinaire Solidarités, Sociétés, Territoires, Université Toulouse Jean Jaurès

**EVOLUTIONS OF PERSONAL NETWORKS ACROSS TIME: A COMPARISON BETWEEN FRANCE AND THE UNITED STATES**

This project aims to understand the evolution of sociability and personal networks in France and the USA, to share data collected in both countries, and to articulate two scales: a macro-sociological analysis of the evolution of personal networks and sociability over the past 30 years, and a qualitative and quantitative analysis of their evolution along life courses based on detailed data on a small sample. By multiplying international comparisons and scales of analysis, we will examine how sociability evolves in Western societies in order to better understand the structures of social cohesion and their evolution.



**Anna SERRA-LLOBET**, Institute of International Studies, UC Berkeley  
**Johnny DOUVINET**, Sciences Humaines et Sociales, Département de Géographie, Université d'Avignon et des Pays du Vaucluse

**FROM EPIC WILDFIRES TO EPIC FLASH-FLOODS: RETHINKING FLOOD RISK MANAGEMENT IN AN ERA OF EXTREMES**

Linking social and applied sciences, this project includes interdisciplinary research on flood risk management, with a focus on California and southern France, regions affected by flash floods. We propose to develop new approaches to assess and manage flash floods after wildfires through improved understanding of the physical and social factors that affect the occurrence of these events.



**Rosemary GILLESPIE**, Department of Environmental Science, Policy & Management, UC Berkeley  
**Julien PETILLON**, Observatoire des Sciences de l'Univers de Rennes (OSUR), Université de Rennes 1

**THE HIDDEN SIDE OF HEAVEN: THE EVOLUTIONARY STORY OF HAWAIIAN LAVA CAVES' WOLF SPIDERS**

While the islands of Hawaii are considered a paradise to study the interplay between ecology and evolution, colonization of caves by spiders has received surprisingly little attention. Thanks to an extensive dataset already gathered on the field and in Museum collections, we started analyzing the relationships between above- and below-ground species of wolf spiders. This project aims at understanding why colonization of Hawaiian caves repeatedly occurred, and how this was translated in terms of morphological adaptations (mainly eye loss or reduction).



**Barbara ROMANOWICZ**, Department of Earth & Planetary Science, UC Berkeley  
**Hélène BARUCQ**, Magique 3D - INRIA, Université de Pau

**DEVELOPMENT AND APPLICATION OF ADVANCED SEISMIC IMAGING TECHNIQUES FOR KEY TARGET STRUCTURES IN THE DEEP EARTH**

Our objective is to initiate a strong collaboration aimed at developing and deploying novel tomographic methods for imaging localized structures in the deep Earth that are either blurred out or not visible in the current global models.





**Richmond SARPONG**, Department of Chemistry, UC Berkeley  
**Virginie VIDAL**, CNRS, Chimie ParisTech

**ENHANCING THE MEDICINAL ACTIVITY OF PIPERIDINE DERIVATIVES BY LATE-STAGE DERIVATIZATION**

The piperidine moiety is prevalent in a wide range of medicines that address human ailments. Despite the well-established efficacy of piperidine-containing drugs, there is a continued need to identify derivatives that possess even more potency and selectivity to overcome challenges such as side-effects. The introduction of substituents on the piperidine skeleton in these medicinally-active small molecules can imbue them with novel or more pronounced activity and selectivity. In this collaboration, we propose a way to derivatize piperidines at one of the resident C-H groups on the periphery of the carbon framework in a process referred to as C-H functionalization in order to access myriad derivatives.



**Uros SELJAK**, Department of Physics, UC Berkeley  
**Benjamin WANDEL**, Institut Lagrange de Paris

**OPTIMALLY MAPPING THE DARK MATTER IN THE UNIVERSE WITH THE CMB OPEN CONFIGURATION OPTIONS**

The microwaves produced shortly after the Big Bang have traveled across nearly the entire visible universe before reaching the Earth today, their paths having been slightly deflected by the gravity field of the dark matter encountered along the way. This distortion both encodes valuable information about the dark (and regular) matter, and obscures properties of the Big Bang itself. How best to extract this information and unobscure the earliest moments in time given increasingly precise instrumental measurements is an open question, one which the teams involved in this proposal are uniquely suited to answer via this France-Berkeley collaboration.



**David SHUSTER**, Department of Earth & Planetary Science, UC Berkeley  
**Kerry GALLAGHER**, Géosciences-Rennes, Université de Rennes 1

**IMPROVING INTERPRETATIONS OF THERMOCHRONOMETRIC DATA THROUGH UPDATES TO MODELING PROGRAMS AND USER EDUCATION**

Low-temperature thermochronometry data are useful for answering a variety of geologic questions. However, interpretations made from such data rely on complex relationships between physical and chemical behavior at the mineral scale, combined with information related to the overall geologic history. This collaboration will (1) update program models used to interpret low-temperature thermochronometric data, (2) host a workshop focused on educating the geologic research community on how to best use such models, and (3) share analytical and lab expertise for new systems being built in the Gallagher lab.



**Jeremy THORNER**, Department of Molecular and Cell Biology, UC Berkeley  
**Aurélie BERTIN**, Institut Curie, PSL Research University, Paris

**DISSECTING THE FUNCTION OF BUDDING YEAST SEPTIN SHS1 THROUGHOUT CELL DIVISION**

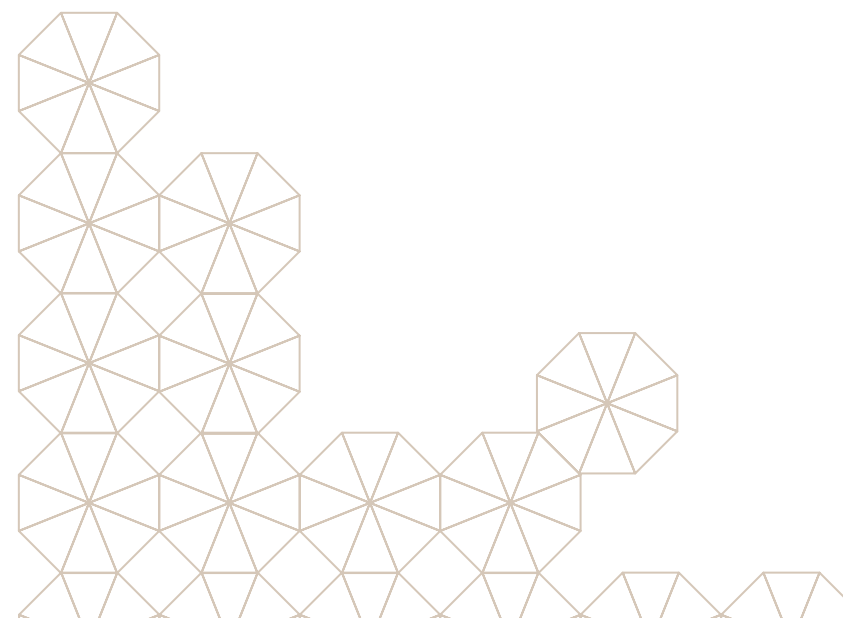
In budding yeast (*S. cerevisiae*), septins are essential for cell division. Within the hetero-octameric *S. cerevisiae* septin complex, the role of the Shs1 subunit remains still unclear. We propose here, using a combination of fluorescence and electron microscopy, as well as biomimetic in vitro and in vivo approaches, to investigate in details the phenotypes of specific mutants of Shs1. Specifically, we will focus our investigations on the C-terminal unstructured domain of Shs1 and on its GTP/GDP binding domain.



**K. Birgitta WHALEY**, Department of Chemistry, UC Berkeley  
**Pierre ROUCHON**, Mathématiques et Systèmes, MINES ParisTech

**QUANTUM FEEDBACK CONTROL FOR INFORMATION PROCESSING**

This Berkeley-Paris collaboration will develop new methods for controlling quantum systems that are based on a novel formulation of quantum feedback operations following continuous monitoring of the quantum degrees of freedom. Such control is essential to achieve the ultra-high fidelity and robustness of operation of quantum devices required for information processing based on quantum principles. Our methods will enable the realization of quantum computers with current quantum technologies.

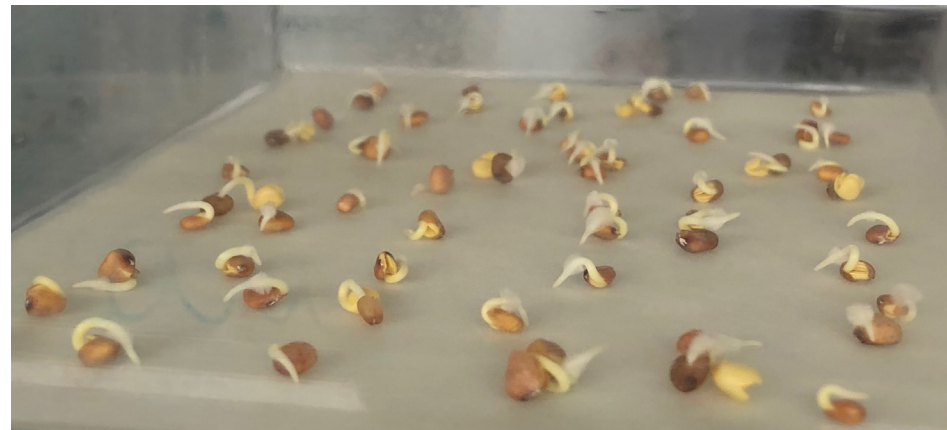




# RECENT PROJECTS



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JUNE 4 – 5, 2019 | BANCROFT HOTEL | BERKELEY, CA

A COLLABORATION AMONG THE CENTER FOR LAW, ENERGY & THE ENVIRONMENT (CLEE), CENTRALESUPÉLEC, AND FLORENCE SCHOOL OF REGULATION (FSR)



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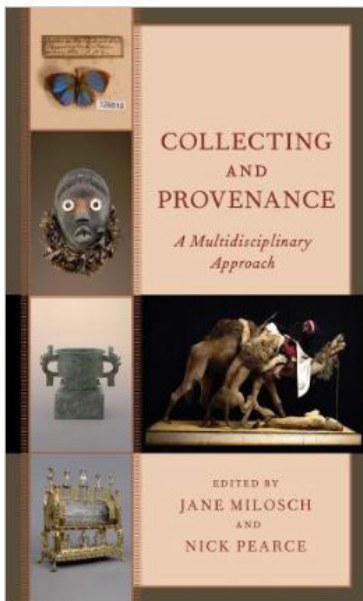
1 and 2 Collaborators Matthieu Barret and Lauren Lui; an experiment with germinating seeds inoculated with a bacterial transposon mutant library (Arkin-Barret 2018) | 3 and 4 "Ovoo" Conference in Mongolian Studies (Dalton-Charleux 2018) | 5 California-France conference on electric vehicle deployment held at Berkeley Law (Farber-Perez 2018) | 6 "New Directions in Himalayan Studies" Conference (Von Rospatt-Gros 2018) | 7 *Collecting and Provenance: A Multidisciplinary Approach* (forthcoming in 2019), featuring a chapter on the violin trade in Paris by Carla Shapreau, Jean-Philippe Échard and Christine Laloue (FBF '18) | 8 Beta version of online tool for advanced learners of French (McLaughlin-Fagard 2017)



6

The two teams each bring their own approaches and emphases to the material, and these are wonderfully complementary. Our final product will be something that neither team could have prepared on its own.

— 2018 grantees TODD HICKEY (Classics, UC Berkeley) and JEAN-LUC FOURNET (Papyrologie byzantine, Collège de France)

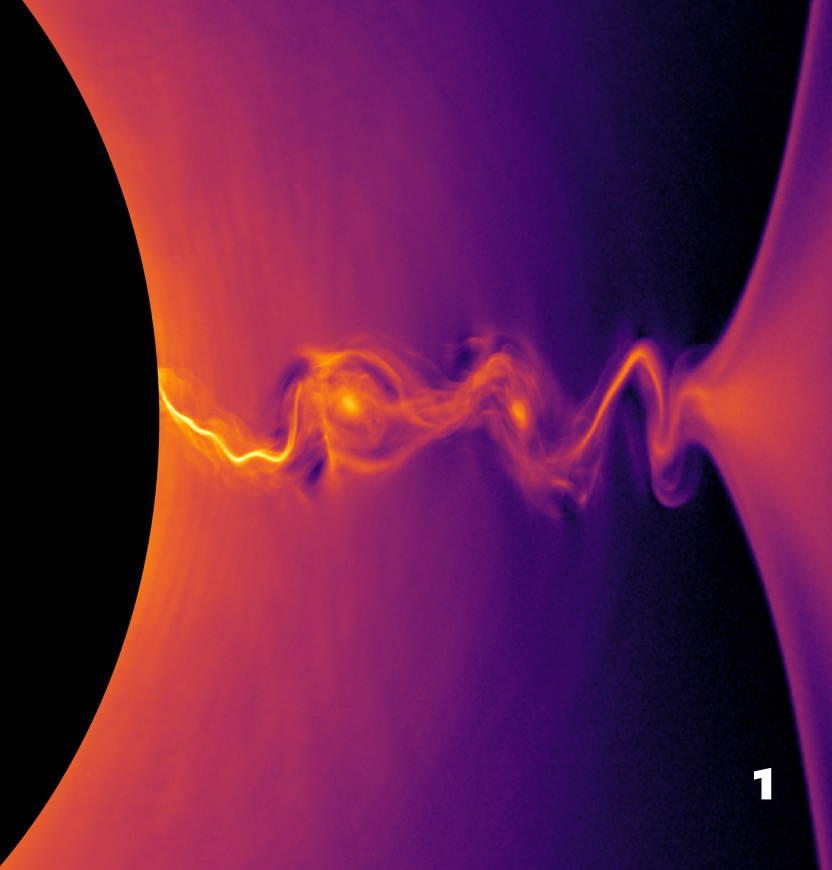


## Disloquées

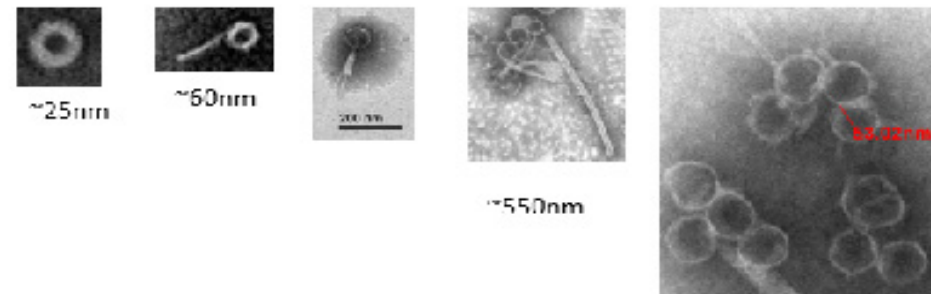
1221 énoncés

modalité	période	source	corpus	énoncé	type	nature	fonction
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oral	contemporain	cefc-gold	CLAPI	huit heures // <b>NNAAMMEE</b> c' est un mec du huit heures // il zone jusqu'à neuf heures	gauche	NOM	sujet
oral	contemporain	cefc-gold	CLAPI	oh <b>NNAAMMEE</b> // <b>tom tu</b> as un plan ce week end // ouais ce week end j'ai un plan moi	gauche	NOM	sujet
oral	contemporain	cefc-gold	CLAPI	ben ouais // ben <b>toi tu</b> peux aller // le métro il t'arrête jusqu'à où	gauche	PRO	sujet
oral	contemporain	cefc-gold	CLAPI	ben toi tu peux aller // <b>toi</b> c' est où ton // le métro il t'arrête jusqu'à où	gauche	PRO	sujet
oral	contemporain	cefc-gold	CLAPI	cours // eh <b>ils</b> savent pas courir ces <b>pélos</b> // oh tu as quoi euh d'autre comme jeu	droite	NOM	sujet

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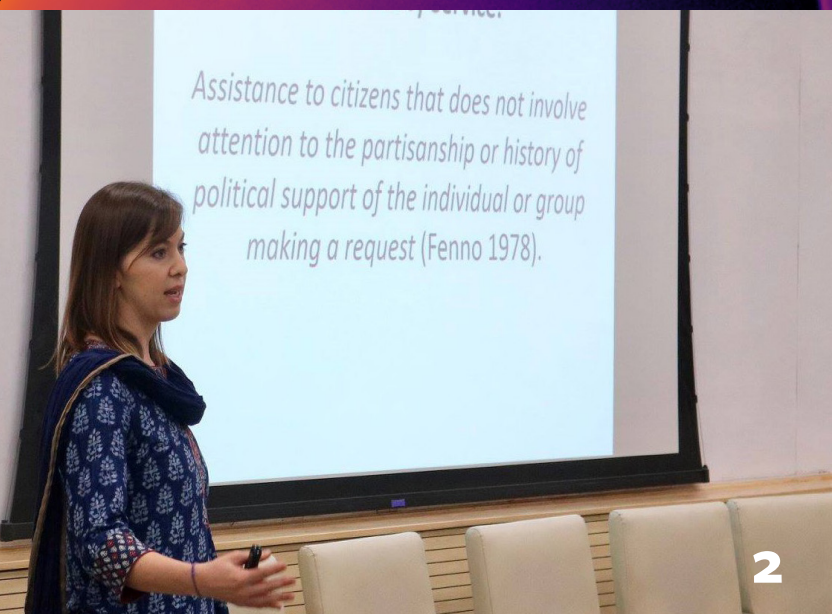


We feel, on both sides, that we have only just begun to open our minds to the approaches and achievements of our counterparts.

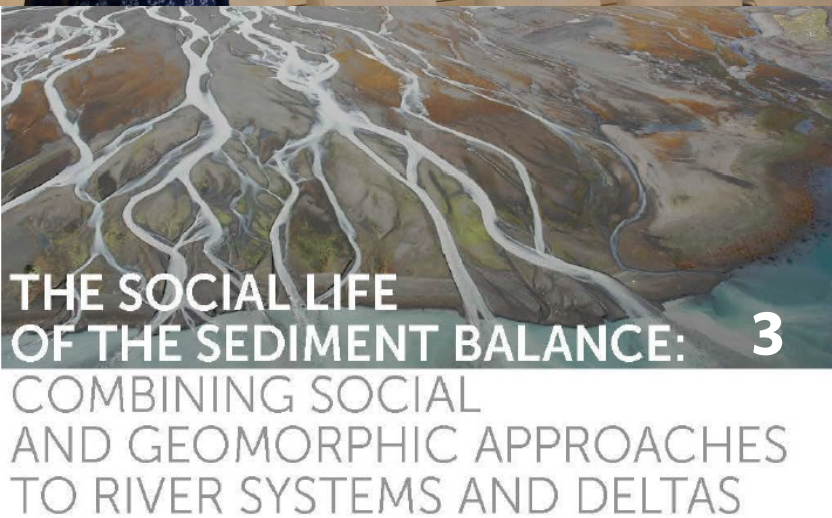
— 2017 grantees IAN DUNCAN (English, UC Berkeley) and NATHALIE VANFASSE (Département d'Études du Monde Anglophone, Aix-Marseille Université)



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1 Visualization of a general-relativistic collisionless plasma simulation showing positron density near event horizon of a rotating black hole (Quataert-Cerutti 2018) | 2 Conference on Political Representation in India (Bussell-Jaffrelot 2018) | 3 International workshop on geomorphic processes (Kondolf-Parrinello 2018) | 4 Plaque-forming plates imaged with Transmission Electron Microscopy (Firestone-Nicol 2018) | 5 "Form Across Literature and the Sciences" Workshop (Duncan-Vanfasse 2017) | 6 Discovering visual patterns in art collections (Efros-Aubry 2017) | 7 Exchange visit to the UC Berkeley Astronomy department (Kalas-Lagrange 2017)

**To celebrate our 25th Anniversary, we asked past grantees to help us track the fruits of their collaborations. Here are some updates:**

**1994** TIM WHITE (Anthropology) and RAYMOND BONNEFILLE (CNRS Marseille) continue to collaborate and publish on their long-term paleoanthropological research project, dubbed "Breakthrough of the Year 2009" by *Science* magazine — MARIE-ANN BOUCHIAT (CNRS/ École Normale Supérieure, Paris) has published three scientific articles with EUGENE COMMINS (Physics)

**1999** KRISHNA NIYOGI (Plant & Microbial Biology) and MICHEL HAVAUX (CEA Cadarache, Saint-Paul-lez-Durance) remain friends and recently collaborated on a paper that was published in top research journal *Plant Cell*

**2001** BRONWYN HALL (Economics) still works with JACQUES MAIRESSE (INSEE-CREST, Malakoff) and has become an associate of the Center for Innovation and Economic Growth at the Collège de France

**2002** KEVAN SHOKAT (Chemistry) and MICHAEL SIEWEKE (Centre d'immunologie de Marseille Luminy) worked with their team to continue studying the differentiation of stem cells

**2003** DIANE AMANN (Law, UC Davis) and MIREILLE DELMAS-MARTY collaborated through 2015 via the Réseau ID Franco-américain/French-American Network on the Internationalization of Law, publishing five joint essays

**2004** JOSEPH CAMPOS (Institute of Human Development) and MARIANNE BARBU-ROTH (École Pratiques des Hautes Études, Paris) co-published seven papers on locomotion and psychological development

**2005** Continued visits and experiments between RICHARD HARLAND (Molecular & Cell Biology) and ANNE-HÉLÈNE MONSORO-BURQ (Institut Curie, CNRS, Orsay) led to four co- publications, most recently in 2017

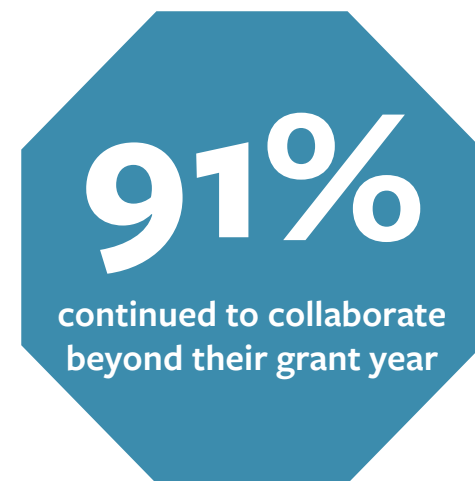
**2006** WEN-HSIN YEH (History) and CHRISTIAN HENRIOT (École Normale Supérieure, Lyon) have jointly published three edited volumes on modern China — NELSON MAX (Computer Science) and FABRICE NEYRET (INRIA, Saint Ismier) co-published two journal articles

**2007** MARIA SCHONBEK (Mathematics, UC Santa Cruz) continued working with LORENZO BRANDOLESE (Université de Lyon), resulting in two published essays

**2008** Thanks to his first FBF grant, EDGAR KNOBLOCH (Physics) met and subsequently hired a student of ALAIN BERGEON (Université Paul-Sabatier, Toulouse), resulting in a long-term collaboration and 15 publications since 2011 — STEVEN BEISSINGER (Environmental Science) has made new connections in biology through JEAN-DOMINIQUE LEBRETON (CNRS Montpellier) and since become involved as a program evaluator for the Université de Pau

**2009** JUAN MEDRANO (Animal Science, UC Davis) and PATRICE MARTIN (INRA Jouy-en-Josas) continued collaborating through 2014, with the participation of graduate students and postdocs — LAURENCE HAPIOT, a student of CHRISTINE HASTORF (Anthropology), defended her dissertation based on research done with GILLES TOUCHAIS (Université de Paris 1 Panthéon-Sorbonne) — CHARLES ALTIERI (English) and ISABEL ALFANDARY (Université Lumière-Lyon 2) received further funding to pursue their project, while several graduate students listed the FBF as an important experience in their successful job applications

**2010** FREDERIC THEUNISSEN (Psychology) and NICHOLAS MATHEVON (Université Jean Monnet, Saint-Etienne) are preparing a paper on the evolution of the use of drumming in woodpeckers for acoustic communication



**2011** The conference led by NIKOLAOS PAPAZARKADAS (Classics) and DENIS KNOEPFLER (Collège de France) ushered in an era of collaboration in the field of Boeotian studies, leading to subsequent conferences in France and Switzerland

**2012** BO LIU (Plant Biology, UC Davis) and DAVID BOUCHEZ (AgroParisTech) initiated a project focused on the molecular machinery that regulates cell division orientation in plants, and have since acquired experimental materials that will lead to innovative findings in the topic — With their FBF grant, JOHN TAYLOR (Plant and Microbial Biology) and TATIANA GIRAUD (AgroParisTech) facilitated two meetings on Fungal Population Genomics, the first hosted in Berkeley with 30 participants from 8 countries and the second in Orsay with participants representing at least 5 countries — The ongoing collaboration of MARLA FELLER (Molecular and Cell Biology) and DAVID DI GREGORIO (Institut Pasteur, Paris) culminated in a 2016 manuscript co-written with graduate student ANNA VLASITS, who conducted experiments in Paris — IGOR GRIGORIEV (LBNL) and FRANCIS MARTIN (INRA, Nancy) launched a large and robust international consortium of scientists working on genomics of mycorrhizal fungi to deliver several high-impact publications and cross-train junior staff in genomic data analysis techniques

**2013** LANCE KRIEGSFELD (Psychology) and MATTHIEU KELLER (CNRS, Université Val de Loire/Tours) have continued to explore the role of a class of neuropeptides called RFamide peptides in olfactory processing and female reproductive function

**2014** NICOLAI RESHETIKHIN (Mathematics) and CHRISTIAN BLANCHET (Université Paris Diderot) are at work on another NSF-supported project that grew out of their France-Berkeley collaboration — The research groups of KAI LIU (Physics, UC Davis) and DAFINÉ RAVELOSONA (Université Paris Sud) continue to collaborate on studies of magnetic materials — LEO BLITZ (Astronomy) and EDITH FALGARONE (École Normale Supérieure, Paris) worked with Berkeley graduate student DYAS UTOMO to publish a recent paper in the *Astrophysical Journal*

**2015** DAN WERTHIMER (Space Sciences Lab) and STEVE TORCHINSKY (Observatoire de Paris-Meudon, Nançay)

continue to collaborate on scientific instrumentation design for pulsars, fast radio bursts, and SETI — Beyond his co-publications with ALAIN NICOLAS (Université Pierre et Marie Curie, Paris), WOLF-DIETRICH HEYER (Microbiology, UC Davis) brought a postdoctoral fellow to Davis, resulting in high impact research developing crucial novel technology to study the mechanism of DNA repair — RICHARD CANDIDA-SMITH (History) and ANAÏS FLÉCHET (Université de Versailles) produced a website, *Transatlantic Culture: Cultural Histories of the Atlantic World 18th-21st Centuries*, and held symposia in Chicago, Middlebury VT, Paris and São Paulo

**2016** TSU-JAE KING LIU (Electrical Engineering and Computer Science) published a conference paper with LOUIS HUTIN (CEA-Leti); a jointly advised PhD student is expected to graduate this year

**2017** LINDA MORRIS (English, UC Davis) and LOUIS HUTIN (CEA-Leti, Université Grenoble Alpes) created a prize-winning documentary based on their project, *Jeanne d'Arc, l'histoire d'une passion*, awarded "Best Documentary" at the 1st Anstia Film Festival in Paris, 2018; a special issue of *American Literary Realism* has been devoted to papers inspired by their work



# **INTERIM REPORTS**

**2018-19**

<b>Adam ARKIN</b> QB3 - California Institute for Quantitative Biosciences, UC Berkeley	<b>Matthieu BARRET</b> IRHS/EMERSYS, INRA - Beaucouzé
<b>Engineering a pathogen-resistant seed microbiome</b>	
<b>Start date:</b> November 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

Good progress has been made on the construction of the synthetic bacterial communities and assessment of growth of these communities in situ. The goals related to the creation of transposon mutant libraries have been delayed because the material transfer agreement between institutions was approved in March 2019, which was much longer than we anticipated. Despite this setback, we have been able to make progress by using another mutant library as a proxy.

We have assessed interactions between the pathogenic bacterial strain Xcc8004 and 33 bacterial strains collected from radish seeds. These strains were selected from a collection of approximately 1,000 strains according to their abundances in the radish seed microbiota and their phylogenetic diversity. We assessed pairwise competition for resources in vitro on radish exudates media and found three strains that significantly decreased the growth of the strain Xcc8004 (assessed by colony forming units). Using a method developed by Dr. Lui, we assessed if secondary metabolites by selected bacteria may also inhibit strain Xcc8004. Our results suggest that in the presence of Xcc8004, members of the synthetic community may produce an inhibitory compound for Xcc8004. In addition, synthetic communities composed of members that have resource overlap with Xcc8004 decrease the growth of Xcc8004 in vitro. We have also assessed the ability of individual bacterial strains to be transmitted from radish seed to seedling. Two strains reduced the growth of Xcc8004 on radish seeds and seedlings. Inoculation of the radish seeds with the synthetic community is planned for our next experiments.

Dr. Lui visited the Barret Lab at INRA to start optimizing the use of transposon mutant libraries on seeds and to see how the Barret lab conducts their bacteria-seed experiments. During the visit we used a mutant library of a known plant-beneficial bacterial species for experiments. Dr. Lui demonstrated how to use transposon

mutant libraries and we obtained data to optimize parameters for fitness experiments on seeds, including increasing the number of seeds used in the experiment, ways to revive the mutant library, and length of time for the experiments. We tested the growth of the mutant library on seed exudate media, but the strain we used does not appear to grow well in that media. When we are able to make mutant libraries of the Barret Lab isolates we will try the seed exudate experiments again. Dr. Lui also taught Barret Lab members how to use the Arkin Lab fitness browser to analyze the data. During her visit Dr. Lui also gave a seminar on her research.

Dr. Barret and his graduate student Guillaume Chesneau will be visiting Berkeley in late April / early May 2019 to help make mutant libraries of the bacterial isolates now that the material transfer agreement has been approved. Dr. Barret will give a seminar on his lab's research during his visit.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

Approximately \$6000 has been spent so far. Dr. Lui visited Dr. Barret's lab at INRA in August 2018 (~\$1900). Approximately \$4100 has been spent on supplies for sequencing, sending materials between labs, and growing cultures and plants. We anticipate spending another ~\$2500 on Dr. Barret and Mr. Chesneau's visit to UC Berkeley in late April / early May and the rest of the FBF grant money on supplies on mutant library creation and experiments.

**3) What remains to be done for this project? When will the project be completed?**

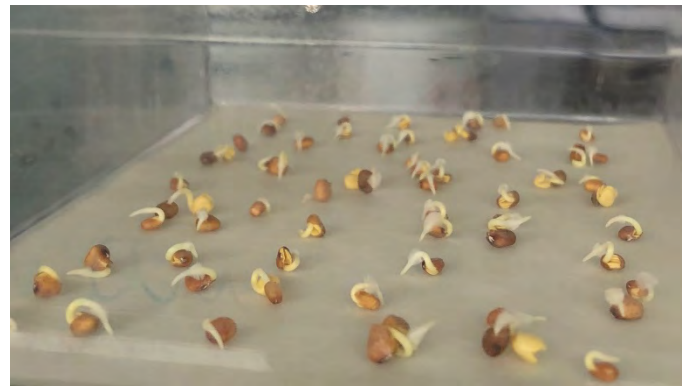
We are assessing the survival and composition of the synthetic community on radish seeds with and without the presence of Xcc8004 on radish seeds. During these experiments we will collect samples for metabolomics experiments investigating the nutrient uptake and secondary metabolite production of the synthetic community members. We will make the mutant libraries in the next few months. These libraries will be sent to France to conduct the experiments on the seeds. In Berkeley we will use the libraries to study the genetic determinants of bacterial interactions. We anticipate completing experiments for this project at the end of CY2019 or early 2020 and then will start writing manuscripts.

4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.

This project has been highly collaborative. Both labs have exchanged expertise in their respective fields with the Barret Lab specializing in seed microbiota and plant microbiology and the Arkin Lab specializing in synthetic biology and high-throughput genetics. Dr. Barret and Dr. Lui video chat on a monthly basis. Our labs have shared ideas on experimental design for studying microbial interactions and computational biology tools for analyzing data. We plan to submit grants together in the future, such as the European Research Council Synergy grant or bi-national NSF-ANR grant.

5) Will this project result in a publication? (Indicate form of publication, if possible.)

We anticipate a publication on our methods to design a synthetic community resistant to a target pathogen in a scientific journal.



Left: Coralie Marais, Dr. Gloria Torres, Dr. Matthieu Barret, Dr. Lauren Lui. Coralie and Gloria assisted with experiments during the visit. Not shown: Guillaume Chesneau and Martial Briand. Top: Dr. Matthieu Barret and Dr. Lauren Lui. Bottom: Experiment with germinating seeds inoculated with a bacterial transposon mutant library.

<b>Jillian BANFIELD</b> Earth and Planetary Sci- ences, UC Berkeley	<b>Simonetta GRIBALDO</b> Microbiology, Institut Pas- teur
<b>Combining genome-resolved metagenomics and phylogenomics approaches to unravel the diversity and evolution of the Candidate Phyla Radiation (CPR) bacteria</b>	
<b>Start date:</b> November 2018	

from the original proposal to get a broader impact/view on microbial evolution. We are still planning a visit for additional members of the American team to Institut Pasteur for Fall 2019. During this visit, likely during the months of September and October, we will complete the exchange of phylogenomic expertise from the French team by hands-on work in the laboratory of Dr. Gribaldo. We plan to conclude the proposed project no later than the end of November 2019.

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

As of July 2019, we have already made robust headway on the project and met several goals of collaboration noted in the original proposal. Since the activation of funds at the end of November, 2018, we have: organized a visit for the French team to UC Berkeley for a week in early April to learn metagenomics techniques, begun working collaboratively on the assembly and analysis of a large phylogenomic dataset, and kept up a regular scientific dialogue over the internet between scientific partners, particularly between project coordinators and the doctoral student benefitting from the support of the FBF. We currently have a manuscript in preparation reflecting the research goals of the proposed project with Alexander Jaffe, the American doctoral student, as lead author. Given the activation date of 11/26/2018, this calendar represents a delay from the original projected timeline; however, we anticipate that the project (and manuscript) will be completed within a year of that date.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

To date, we have spent approximately \$4,500 of the funds to support travel of the French team and work between partners during their stay at UC Berkeley. Dr. Gribaldo is currently hosting Dr. Cindy Castelle and we anticipate that we will spend an additional \$6000 of the funds to support further visits for the American team (Jill Banfield, and Alexander Jaffe) to Paris during fall of the 2019 to complete the exchange, as originally budgeted.

**3) What remains to be done for this project? When will the project be completed?**

Dr. Castelle is currently working with the French team on part of the phylogenomics project and is expanding it

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The project has been an extremely collaborative effort so far, encompassing the exchange of data, methodological expertise, and advising between the French and American teams. In particular, the American doctoral student Alexander Jaffe has benefitted immensely from technical training in phylogenomics and additional advising from Dr. Gribaldo and her laboratory members. We anticipate that the visit during the fall of 2019 will strengthen these connections and possibly catalyze and finalize work on additional co-authored projects in environmental microbiology and microbial evolution. Finally, Dr. Gribaldo has applied for and received the UC Berkeley Miller Visiting Professorship for Spring 2020 during which she will continue to work closely with the Banfield Lab on campus.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

We are currently drafting a manuscript addressing the main project aims of 1) resolving phylogenetic relationships with the bacterial Candidate Phyla Radiation and 2) examining patterns and evolutionary drivers of metabolic diversification. We anticipate that this manuscript, with UC Berkeley doctoral student Jaffe as lead author, will be submitted to a competitive peer-reviewed journal by the end of the grant period in November 2019.

<b>Louise BERBEN</b> Chemistry, UC Davis	<b>Marc ROBERT</b> Chemistry, Université Paris Diderot
<b>Exploring Photocatalytic CO<sub>2</sub> Reduction to Fuels with Small Molecular Iron Clusters</b>	
<b>Start date:</b> December 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

A student from PI Berben's lab travelled to Paris Diderot in February 2019 and during his three week stay he worked with a student in PI Robert's group to investigate the photocatalytic reactivity of the Berben lab iron cluster catalyst and its ability to reduce CO<sub>2</sub> or CO into fuel-type products such as formate or methanol. The catalyst was studied under a variety of reaction conditions that included variation of the solvent, headspace gas, photosensitizer, and reaction time, and those initial experiments point to potentially interesting results using [Ru(bpy)<sub>3</sub>]<sup>2+</sup> as photosensitizer in MeCN solution with CO gas included to provide extra stabilization for the catalyst. At this point, the project is moving according to the original timeline and the survey of the catalyst reactivity has been almost completed as described in the proposal. So far, no conclusive results or detailed mechanistic studies have been fully completed.

PI Berben has visited Paris where she attended the Cyclic Voltammetry International School for 1 week at Paris Diderot, and she presented invited seminars at four universities and participated in Robert lab meetings. PI Robert from Paris Diderot will visit Davis during October 2019. Plans for exchange of graduate students and PI's and for student training are continuing according to the timeline outlined in the proposal.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

To date, we have spent about \$9000. We anticipate that all of the available funds will be spent over the duration of the award. Remaining funds will support the visit of Robert to UC Davis and lab supplies as outlined in the budget.

**3) What remains to be done for this project? When will the project be completed?**

Remaining experiments are currently underway at Paris Diderot and are being pursued by a graduate student. These remaining experiments include investigation of water as a solvent system, and the use of CO and CO<sub>2</sub> gas mixtures in stabilization of the cluster. Development of photosensitizers suitable for use in aqueous media is also ongoing to facilitate the cluster reactivity.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The project has so far enabled one student from Berben's group to spend 3 weeks with experiments at Paris Diderot and to learn new techniques from students at Paris Diderot. The project has also enabled Berben to spend 4 weeks at Paris Diderot where she participated in the Cyclic Voltammetry International School, in Robert lab group meetings, presented a seminar, and interacted regularly with CNRS staff, graduate students and postdocs at Paris Diderot. During the visit, Berben presented seminars at Université de Paris Diderot, Université de Paris Sud D'Orsay, Collège de France, and Institut Lavoisier Versailles. PI Robert will travel to Davis in October 2019. He will present lectures at UC Davis and at the Joint Center for Artificial Photosynthesis – Lawrence Berkeley Lab (JCAP-LBL). He will also present electrochemistry coursework at Davis and this will be shared virtually throughout JCAP-LBL so that it is available to students at LBL and at various UC campuses.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

Based on the initial results, it is possible that this project will result in a publication such as a journal article, review article or conference presentation. We cannot be sure at this time.



<b>Benjamin BLACKMAN</b> Plant & Microbial Biology, UC Berkeley	<b>Hélène BERGES</b> CNRGV / INRA, Toulouse
<b>Examining the history and impact of gene content variation in sunflower</b>	
<b>Start date:</b> July 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The aim of our proposal is to develop genomic resources that will allow us to examine structural variation in the genomes of wild and domesticated sunflower, with the ultimate goal of examining how this variation may have been impacted by the domestication process. To date, we have made progress on developing optical maps as well as advancing resources that will improve their utility and connection to domestication. Specifically, DNA has been extracted and optical mapping has been completed on one wild individual and one landrace individual. In the course of analyzing that data, new computational methodologies for distinguishing the two allelic sequences from each highly heterozygous individual were advanced. The sunflower reference genome (from an elite oilseed line) has had a revision during this period, which is facilitating better comparisons to highlight true structural variants between the reference and these samples as well as other optically mapped elite varieties. In addition, we have done additional sequencing of an individual from the same wild population as the individual we have optically mapped so that we can build a better assembly for connecting structural variation we find with the underlying nucleotide sequence. An initial *de novo* assembly with this data looks strong and we are working to improve it further. The new sunflower reference genome is also facilitating our efforts to identify candidate domestication genes, fitting well with our timeline to compare the locations of structural variants to the locations of domestication sweeps going forward. Graduate student Peter Stokes and postdoctoral scholar Dr. Melis Akman have driven the *de novo* assembly and domestication sweep analyses, respectively.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

To date, we have spent \$2630 of our funds to perform two lanes of 150bp PE sequencing on a 10X Chromium library for the wild individual from which we will build a *de novo* genome assembly. Once we determine that no additional spending at Berkeley is needed, we will use the remainder toward the costs of optical mapping incurred by the CNRGV in Toulouse.

**3) What remains to be done for this project? When will the project be completed?**

The next steps of the project will be to integrate the two optical maps produced by Helene and the scientists at CNRGV with the *de novo* wild assembly and with the population genomics results generated by Ben and his group at UC Berkeley. We will also pursue bulked optical mapping of additional wild and landrace sunflower pools to determine whether that is a worthwhile approach for diagnosing adaptive divergence in structural variation or for genetic mapping.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

We have held Skype meetings between the staff involved at CNRGV and at UC Berkeley, and Helene and Ben also connected in person at the International Plant and Animal Genomes meeting in January. These interactions have spurred ideas for further development of the project and for exchange of ideas about applications of other technologies Helene's group at the CNRGV is developing for the work being pursued in the Blackman Lab.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

How the results will be published will be determined both by the eventual findings obtained and whether they are better submitted on their own or best integrated with additional datasets being produced by the Berges and Blackman groups.

<b>Jennifer BUSSELL</b> Political Science, UC Berkeley	<b>Christophe JAFFRELOT</b> CERI, Sciences Po Paris
<b>Political Representation in India: The Berkeley-Sciences Po Indian Legislators Project</b>	
<b>Start date:</b> October 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

In our original proposal, the PIs—Jennifer Bussell, Thad Dunning, and Christophe Jaffrelot—applied for \$14,500 to cover the costs of three workshops to support our shared research agenda. We received a grant of \$11,300 from the France Berkeley fund for this initiative. We report here on our activities during the first 6 months of the grant period. On October 16-17, 2018, Christophe Jaffrelot, along with our collaborator Gilles Vernier, visited UC Berkeley to give a talk at the Institute for South Asian Studies and to meet with Jennifer Bussell and Thad Dunning to discuss the next steps for our co-authored paper on political representation in India. During this workshop, we reviewed the status of the datasets that we were planning to merge to serve as the basis for the paper and discussed potential approaches for the framing of the paper. We finished the workshop with a set of next steps for each of the team members, to move forward on the project. While this workshop was proposed as a part of our application, it was funded instead by a grant from the Institute for South Asian Studies. This additional \$4,000 grant allowed us to make up for the difference in our proposed costs for three meetings during the grant period and the amount we were awarded by the FBF.

On November 8, 2018, Jennifer Bussell and Thad Dunning met with Christophe Jaffrelot in Paris, France for a second meeting to review interim progress on the dataset and make plans for a third workshop/conference in India with a larger set of participants. At this meeting we finalized the list of invitees and made additional preparations for the conference. The costs associated with this meeting were \$3,128. On December 21, 2018, we held a conference on Political Representation in India at Ashoka University in Sonapat, India. This conference was co-sponsored by our collaborator Gilles Vernier and the Trivedi Center for Political Data at Ashoka. Specifically, the Trivedi Center covered the costs of the venue,

meals, local transportation, and housing for conference participants. The conference included panels on representation, political economy, and fieldwork in India, with presentations from 13 scholars, including Jennifer Bussell and Christophe Jaffrelot. Individuals representing universities in Canada, France, India, Israel, and the United States participated (a conference brochure with participant list is provided in the Appendix to the report,<sup>1</sup> in addition to photographs from the Conference). All of the presentations touched on topics related to our shared research agenda, and the conference succeeded in bringing together scholars at the cutting edge of research on politics and representation in India.

As originally proposed, the additional costs for this workshop were paid for by a combination of the France Berkeley Fund and contributions from the Center on the Politics of Development (CPD) at Berkeley. Specifically, the France Berkeley Fund covered the international travel costs of the PIs, while the CPD covered the international travel costs of all additional participants from outside of India and domestic travel costs for those based in India. The total travel costs for the conference were \$23,862, of which the France Berkeley Fund covered \$6,797 and CPD covered \$17,065. In addition to the workshops and conference, we have been working together during this period to finalize the dataset for our working paper, which includes a merging of data from Bussell's Politician Field Experiment dataset and the Trivedi Center's Indian Assembly Legislators and Candidates Caste Dataset 1952 – Today. This process included a coding of the jatis (sub-castes) of fictitious individuals in the Bussell dataset by Jaffrelot and our colleague Jusmeet Singh Sihra. These data have now been merged and the next step is to clean and match the jati data, so as to finalize the dataset.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

We have spent \$9,925 and \$1,375 of our grant remains. We will work together to determine how best to allocate these funds. We anticipate spending the full amount of the grant.

**3) What remains to be done for this project? When will the project be completed?**

Over the remainder of the grant period, the PIs and collaborators will be working on data analysis and

a draft of a working paper on the socio-economic correlates of politician responsiveness in India. We expect to have a full draft of this paper by the end of the grant period and to be able to begin workshopping the paper at conferences and with colleagues over the next year, prior to submitting it to a top field journal in Political Science.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The project has been fully collaborative and we have worked together at both of our respective institutions. We expect that this collaboration will continue after the grant period, as the PIs continue to work together on related topics.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

We anticipate completing and submitting a journal article on the basis of this project.



Participants in LIA-SPINPER - University of California Berkeley Conference on Political Representation. December 21, 2018



<b>Danica CHEN</b> Nutritional Sciences & Toxicology, UC Berkeley	<b>Mélanie HAMON</b> Unité des Interactions Bacteries-Cellules, Institut Pasteur
<b>Effects of aging on the immune system and risk of infectious diseases</b>	
<b>Start date:</b> December 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

We have generated a mouse model that activates SIRT2 to rejuvenate aged hematopoietic stem cells.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

About \$1000 has been spent. It is anticipated that \$11,300 will be spent.

**3) What remains to be done for this project? When will the project be completed?**

We will infect the mouse model we have created with *Listeria monocytogenes* and examine the bacterial loads. Around the end of the year.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The proposed collaboration will allow the generation of data that could then be used for larger funding applications (i.e. NIH or HFSF). Furthermore it will bring together researchers and facilitate the translation of novel biological pathways discovered at UCB into the therapeutic potential for infectious diseases at Pasteur Institute. This collaboration will enhance the research on infectious diseases at Berkeley and in return cell biology at Institut Pasteur.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

Yes.

<b>Daniel FARBER and Ethan ELKIND</b> Center for Law, Energy & the Environment, UC Berkeley School of Law	<b>Yannick PEREZ</b> Université Paris-Sud
<b>Electric Vehicle Deployment for Urban Residents: Policy and Lessons Learned between France and California</b>	
<b>Start date:</b> December 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The FBF grant provides seed funding for a California-France conference to be held at UC Berkeley Law on electric vehicle (EV) deployment, specifically lessons learned from France and California on expanding access to EVs among urban residents. The Berkeley conference is complemented by the annual Armand Peugeot Electromobility Conference held in Paris now on the 6th iteration in 2018 (Armand Peugeot Chaire, 2017). Achievements: the conference is now scheduled for Tuesday, June 4th through Wednesday June 5th. Berkeley Law's Center for Law, Energy & the Environment (CLEE) and Université Paris SUD 11 lead organizers have arranged for the venue for the two days, crafted the agenda, and confirmed approximately one-third of the speakers to date, with invitations outstanding for the remaining speaker slots. In addition, the organizers are arranging a site visit at a nearby EV-related facility, for the afternoon of the second day of the conference.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

Neither institution has spent funds to date, other than to incur personnel costs in organizing time. The event, including travel and personnel costs, is likely to require \$35,000 in funds from both institutions, most of which will be covered by outside sponsors.

**3) What remains to be done for this project? When will the project be completed?**

The two schools need to confirm the remaining speakers, per the agenda, and promote the event among key stakeholders to secure strong attendance. The institutions also need to finalize any travel arrangements for speakers and

organizers, as well as finalize details for the second-day off-site EV facility visit. Following the event, the universities will draft a short document summarizing key findings from the discussion for public release (see below for more information). That draft will be made available to the public by September 2019. At that point, the project will be completed.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

Both sets of university organizers from the French and UC institutions have been collaborating on the agenda, panel composition, and other plans for the event. All panels will feature speakers from both countries, and all plans for the event have been jointly decided upon by the organizers through email and Skype calls.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

This project will result in a "conference policy brief" released by the institutions that summarize key points from each panel of the day. We intend to release it on-line by September 2019 for the general public as a PDF. The universities will promote the publication among their networks.



**JUNE 4 – 5, 2019 | BANCROFT HOTEL | BERKELEY, CA**

**A COLLABORATION AMONG THE CENTER FOR LAW, ENERGY & THE ENVIRONMENT (CLEE), CENTRALESUPÉLEC, AND FLORENCE SCHOOL OF REGULATION (FSR)**

<b>Daniel FELDMAN</b> Molecular & Cell Biology, UC Berkeley	<b>Daniel SHULZ</b> CNRS, Gif-sur-Yvette
<b>Multiwhisker Feature Coding in Mouse Somatosensory Cortex</b>	
<b>Start date:</b> October 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The project supports collaborative research into the neurobiology of tactile perception by the Shulz and Feldman labs. FBF funding is specifically used to support personnel visits between the two laboratories, with the goal of discussing research, sharing techniques, and developing new lines of research focused on the theme of multi-whisker sensory coding in mouse somatosensory cortex. Prior to the FBF award, the two laboratories studied different aspects of this problem. The FBF award enables discussions and visits that will let us develop a synergistic collaboration. We planned four visits – one each by a Feldman lab junior scholar, a Shulz lab junior scholar, by Dr. Feldman and by Dr. Shulz. The first visit was by Dr. Matias Goldin, a postdoctoral researcher in the Shulz laboratory, in November 2018. This was an 8-day stay that involved presentation and discussion of ongoing research, learning recording methods and neurophysiology and data analysis techniques, and multiple discussions on how recent Feldman lab findings on neural coding of 2-whisker combinations could relate to Shulz lab findings on higher-order combination tuning. At the end of this visit, we jointly proposed 3 experiments that would help synthesize Feldman and Shulz lab findings into a single coherent model of multi-whisker tuning. These are: 1) Determine the optimal single-whisker deflection waveform that drives strongest responses in mouse somatosensory cortex. This would be done by the Shulz lab (who are expert in these methods), and provided to the Feldman lab for testing in 2-whisker combination tuning. 2) Perform in vivo neurophysiology experiments that test how tuning for different whisker deflection waveforms (Shulz lab expertise) is related to tuning for 2-whisker combinations (Feldman lab expertise). This would be done in the Feldman lab. 3) Test whether tuning for 2-whisker combinations (Feldman lab expertise) is related to tuning for local motion vectors spanning 3 or more whiskers (which is a high-dimensional space in which Shulz lab is expert). This would be done in the Shulz lab. Substantial experimental

progress has already been made on Experiment 1, and we expect analysis to be complete in about a month. Technical development to perform Experiment 2 in awake mice is underway, including successful development of a behavioral training and recording protocol by the Feldman lab for performing these experiments in awake mice.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

We have spent \$1399.44, for flight & hotel for Dr. Goldin on his lab visit to Berkeley. We anticipate spending the balance of the award on the subsequent laboratory visits.

**3) What remains to be done for this project? When will the project be completed?**

Visits by the two laboratory heads will take place in summer or early fall. The date for a visit by a Feldman lab junior scholar is not clear, but will be worked out soon.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The France-Berkeley Fund funding is essentially seed funding, enabling us to launch a fruitful collaboration between the Berkeley and CNRS laboratories. The first stages of this project have already allowed us to develop a concrete collaboration plan, and to begin to develop the methodology needed for the full experimental collaboration. This collaboration involves both lab heads and junior scholars at both institutions. This collaboration is likely to extend for several years, well beyond the duration of the FBF grant. Thus, we are off to a strong start, with a clear new collaboration between our two laboratories and institutions.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

It is likely to result in a peer-reviewed, primary scientific paper, after the experimental studies are complete.

<b>Mary FIRESTONE</b> Environmental Science Policy and Management, UC Berkeley	<b>Graeme NICOL</b> Laboratoire Ampère, École Centrale de Lyon
<b>Determining the interaction of viruses with auto-trophic prokaryotic hosts in soil</b>	
<b>Start date:</b> December 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The original timeline of the project has been delayed due to unexpected delays in processing of samples necessary for the bioinformatic component of the work, and therefore only 25% of the lab exchanges have taken place. Nevertheless, the original work outline remains unchanged and we are confident that all objectives will be met by the project end date (November 30th 2019). We have processed all laboratory experiments with DNA samples successfully sequenced by the Joint Genome Institute (JGI).

The current revised timeline is therefore:

Exchange 1) 6th April – 3rd May 2019 (originally November 2018 in application): Alexa Nicholas (grad student) visited École Centrale de Lyon for one month and developed viral particle extraction and phage plaque assays  
Exchange 2) 6th August – 6th September 2019 (originally February 2019): Sequencing by the JGI has been recently completed and Sungeun Lee and Graeme Nicol will visit Berkeley for one month to be trained in bioinformatic analysis of metagenomic samples for the assembly of draft metagenomes of host and viral populations.  
Exchange 3) November 2019 (originally August 2019): Firestone visits École Centrale de Lyon for one month for synthesis of data and preparation of manuscripts.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

After one visit (Alexa Nicolas, Berkeley to Lyon), the total spend is \$2,300. We still anticipate to spend the entire grant with both Graeme Nicol and Mia Sungeun Lee spending one month (from 6th August) at Berkeley, and Mary Firestone visiting Lyon in November 2019.

**3) What remains to be done for this project? When will the project be completed?**

All experimental laboratory work outlined in the proposal has been performed successfully. The major part of the work remaining is the bioinformatic analysis of the 30 metagenome samples generated during the experimental work, and will be the major focus during the visit of Lee and Nicol to Berkeley in August 2019.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The collaboration initiated by FBF grant has resulted in a joint submission by both Firestone and Nicol to the Department of Energy's program 'Cross-Domain interactions are the foundation for nutrient cycling in a grassland soil'. This multi-partner application is led by Firestone, with Nicol named as the external collaborating partner. It would facilitate a six-month secondment of a researcher from the Nicol lab to work at Berkeley. The scope of the research proposal directly continues the work performed in the FBF program, specifically examining the interaction of nitrifying prokaryotes and viruses in Californian grassland systems.

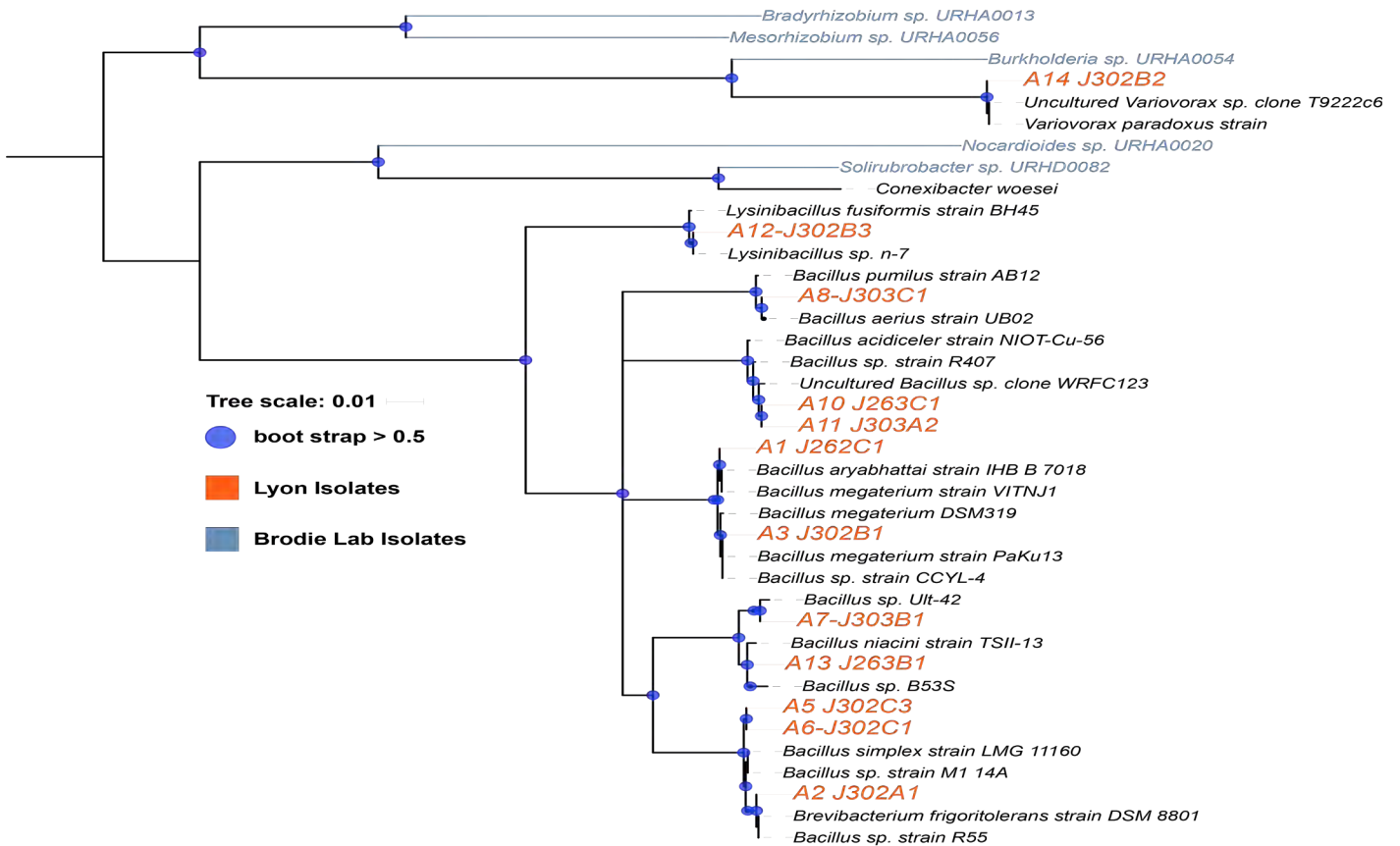
**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

We anticipate that the work will form the basis of at least three primary research publications in top 'field-specific' microbial ecology journals in 2020.

Addendum:

PhD candidate Alexa Nicolas spent April 4 – May 4 at Lyon where she worked with Graeme Nicol's graduate student Mia Lee to isolate bacteria from soil, purify viruses that infect isolated bacteria, and image the subsequent virions. In the process, Nicolas also tested new sample preparation strategies to image viruses extracted directly from soil, a challenge facing both the Firestone and Nicol laboratories.

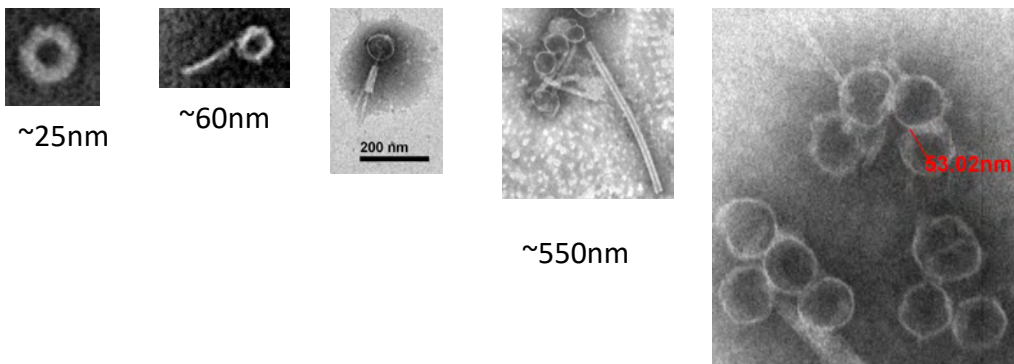
1. Isolated bacteria from soil



The 16S gene was sequenced and assembled for 12 new isolated bacteria from soil. Soil bacterial isolates from other labs were also used to isolate novel viruses from soil.

- Using soil-enrichment strategy for viruses, viruses from soil were purified as plaque-forming units overlaid on bacteria (newly isolated from soil).

Supernatant from plaque-forming plates was imaged with Transmission Electron Microscopy to reveal many morphotypes.





<b>Teresa HEAD-GORDON</b> Chemistry, UC Berkeley	<b>Jean-Philip PIQUEMAL</b> Laboratoire de Chimie Théorique, Sorbonne Uni- versité
<b>Advanced Potential Energy Surfaces for Condensed Phase Simulations: Theory and Applications</b>	
<b>Start date:</b> December 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The proposed research is built on three main thrusts.

First, to impact the efficiency of polarizable force fields, we propose to start with the iEL/o-SCF scheme developed in the T. Head-Gordon group that eliminates the SCF iterations in classical polarizable induced dipoles altogether, by making it more extensible to multi-time stepping methods, as well as to enable polarization embedding for advanced QM/MM calculations. (completed)

Second, these algorithmic improvements must be developed as robust software, which we plan to do within the state of the art Tinker-HP program developed by the J.P. Piquemal group (completed 50%)

Third, the algorithmic and more robust software implementation will allow us to perform much more sophisticated electric field calculations projected onto enzyme active sites to make predictions for improvements in the catalytic step for designed enzymes. (in progress)

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

We used the grant to pay for Dr. Sara Cheng to travel to Sorbonne Université to install the iEL/SCF and we will now extend that to the most efficient version iEL/o-SCF. We have spent ~1/3 of budget so far. We will be holding a workshop on many of these science directions, and Jean Philip and one of his scientific staff will be attending in late July/August and there will be additional funds used then.

Teresa Head-Gordon will also be going to Sorbonne Université in mid-July to give a talk in the TINKER/CHarMm meeting and will use funds for that too.

**3) What remains to be done for this project? When will the project be completed?**

Science is never completed but as stated in (2) the project will be finished by December, but interactions with Jean Philip and THG will continue past this date.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

We are working together on adding THG software capabilities to TINKER-HP from Piquemal's group. See (3)

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

Yes, in peer reviewed journal.

<b>Rebecca HEALD</b> Molecular & Cell Biology, UC Berkeley	<b>Denis CHRETIEN</b> Université de Rennes 1
<b>Understanding the structural basis regulating the size and architecture of the mitotic spindle</b>	
<b>Start date:</b> December 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The goal of this project is to better understand the regulation of spindle size and architecture by examining its substructural components at the single-microtubule level and comparing them between *X. laevis* and *X. tropicalis*. To do so, we want to explore two separate microtubule-organizing sites integral to spindle assembly: the spindle poles (Aim 1) and chromatin (Aim 2). During the six first months of the FBF project, we focused on resolving microtubule organization at spindle poles (Aim 1). Under the supervision of Romain Gibeaux in the Chrétien Lab, Karel Mocaer, master student, characterized DMSO and Ran asters in both *X. laevis* and *X. tropicalis* extracts, including their size, microtubule density and distribution. She showed that both DMSO and Ran asters were smaller and contained less polymerized tubulin when assembled in *X. tropicalis* extract. However, only DMSO asters exhibited an increased microtubule density at the aster center in *X. tropicalis* extract, validating these asters as a suitable spindle pole model. We thus chose DMSO asters for further analysis. We measured microtubule growth speed using live fluorescence imaging and showed no difference between extracts, which thus cannot explain the observed differences. Moreover, we initiated electron tomographic reconstructions of microtubule tri-dimensional organization in both *Xenopus* species. This however showed to be a much longer-term goal than the period of this France-Berkeley Fund. We thus turned towards a recently described method, Expansion Microscopy, to gain resolution. To apply this method to *Xenopus* egg extracts, Karel joined the Heald Lab for 3 months and worked under the supervision of Maiko Kitaoka, PhD Student. Together, they optimized the method, and Karel has continued these experiments back in Rennes. The results are successful and we now have acquired both spindles and asters in both extracts at high-resolution, which will allow us to examine microtubule organization in greater detail. We are currently analyzing our data.

2) Indicate how much money has been spent to date. How much do you anticipate spending?

Spent  
VISA fees, transportation and housing fees for Karel Mocaer, Shipping costs \$6,000

Anticipated to be spent  
Transportation and housing fees for Maiko Kitaoka \$3,000; Materials: \$2300

**3) What remains to be done for this project? When will the project be completed?**

We are currently analyzing the results of our Expansion Microscopy experiments to reveal the differences in microtubule organization between both frog species in asters as well as in whole spindles that we were able to obtain. Next, we will focus as planned on Investigating chromatin-driven microtubule assemblies (Aim 2). To do so, Maiko Kitaoka, will join the Chrétien lab for four weeks and apply an innovative electron microscopy method, ChromEMT, to egg extract chromosomes and associated microtubules. Our goal is to reveal chromatin details at the levels of centromeres and bulk chromatin, as well as details about associated microtubules.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

This project led us to collaborative work that has already exceeded expectations. Not only are we exchanging students, but we also enabled young scientists to work synergistically together. The first example is the work of Karel Mocaer, Maiko Kitaoka and Romain Gibeaux on the successful application of Expansion Microscopy to the egg extract system. We now hope that we will be able to be as successful with the ChromEMT method. In addition, while the methods we originally planned to apply to this project were classical and well established, the continuous communication and feedback on results between our two laboratories led us to orient our research towards more original and innovative methods, again exemplified by our work using Expansion Microscopy. It is already clear that what will come out from this collaboration will be of great advantage to both of our laboratories and lead to further collaborative research.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

The biological results obtained during the course of this FBF project will likely be included in the publication of Romain Gibeaux's Research project but this is expected to be in the longer-term. Nevertheless, while we are still in the process of analyzing our Expansion Microscopy data and will probably need additional experiments, it is likely that we will be able to publish a paper about the application of this method to the study of structures assembled in *Xenopus* egg extract. In addition, if we successfully apply ChromEMT to chromosomes assembled in egg extract, this will be beneficial to Maiko Kitaoka's PhD project and if so, will be included in the publication of her PhD work.

<b>Todd HICKEY</b> Classics/The Bancroft Library, UC Berkeley	<b>Jean-Luc FOURNET</b> Collège de France/EPHE
<b>Everyday writing in a literary town: Some rediscovered tablets from late antique Panopolis</b>	
<b>Start date:</b> November 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The project is proceeding according to the schedule in the grant proposal. The Panopolite tablets were a focal point in Hickey's papyrology seminar (Classics 225) in autumn 2019, and each participant prepared an edition of a board from the "codex" as part of her/his final project. At the same time, Fournet and his post-doctoral scholars Yasmine Amory and Valérie Schram began working on the tablets in Paris. In mid-May representatives from the Berkeley seminar (Hickey; Samuel Stubblefield, PhD student in History) will meet the French team in London to share their research and present some of it to the public at a conference at the British Library (20 May). Hickey will offer an overview of the codex, while Schram and Stubblefield will discuss specific aspects of it (its petitions and evidence for business education, respectively). Fournet and Amory will lead a workshop in the afternoon concerning the problems of decipherment and interpretation that remain to be solved. A copy of the conference program (which also includes two speakers whose work is related to our own) has been attached.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

Since the funds already expended seem not to have been debited properly (at least according to PI Portfolio), Hickey cannot provide exact figures, but most of the transportation charges for the conference speakers have been paid (approximately \$3500), as has a deposit for the catering (approximately \$500). It is anticipated that all grant funds will be used.

**3) What remains to be done for this project? When will the project be completed?**

After the conference (see 1), the edition of the tablets needs to be completed. Though the vast majority of the work of decipherment is complete, a few cruces remain,

and the commentary is only skeletal at the moment. We shall have a better sense of whether our original timetable (indicating submission of a manuscript to a publisher for review in autumn 2019) is feasible after our meeting in London.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

Thus far the project experience has been very positive, and we are looking forward to our face-to-face meeting in London. The two teams each bring their own approaches and emphases to the material, and these are wonderfully complementary. Our final product will be something that neither team could have prepared on its own.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

Yes, it is anticipated that the edition (3 above) will be published in a peer-reviewed, open-access series.

<b>G. Mathias KONDOLF</b> Landscape Architecture & Environmental Planning, UC Berkeley	<b>Giacomo PARRINELLO</b> Centre d'Histoire de Sciences Po, Paris
<b>The Social Life of the Sediment Balance: A Social and Geomorphic Approach to the Transformation of River Systems and Deltas</b>	
<b>Start date:</b> September 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The project focuses on the nexus of social and natural processes behind the modification of sediment balance in river systems and deltas. It does so by combining methodologies and approaches from the social sciences and humanities and the natural sciences, namely fluvial geomorphology. It builds on a pre-existing collaboration between the two coordinators, a fluvial geomorphologist (prof. Kondolf) and an environmental historian (prof. Parrinello) and was originally aimed at organizing an international, multidisciplinary workshop in Berkeley in the spring 2019. The workshop, as in the original proposal, is planned for the spring 2019, on May 29-30, during prof. Parrinello's visit in Berkeley.

In preparation of the international workshop in 2019, prof. Kondolf organized a smaller one-day workshop in Lyon in the fall 2018, with funding from the RFIEA (the French Network of Institutes for Advanced Study). The Lyon workshop was aimed at kick-starting the conversation which is at the core of the project by focusing on three river basins – the Rhone, the Po, and the Ebro – on which a larger body of research exists and which pose relatively smaller methodological issues for an interdisciplinary analysis. The workshop convened scholars and practitioners from Italy, France and Spain and allowed us to identify some issues that will guide the discussion in Berkeley this spring.

Following the successful workshop in Lyon we issued the call for paper early this January 2019 (see attached poster) and circulated it through relevant networks. As discussed in our proposal, the call for paper explicitly encouraged Ph.D. students, postdocs and other early career scholars to apply. The call closed on January 31. We received 35 applications from scholars working in multiple countries and with a background in environmental history, historical geography, Science and technology Studies and fluvial geomorphology. We selected a pool of

13 participants, including 2 Ph.D. students and 5 early career scholars.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

Thus far we have spent 2,216.95 USD in flight tickets for the workshop participants. We anticipate spending the remaining amount for flight tickets (in process) and participants lodging at the UC Berkeley Men's and Women's Faculty Clubs and food during the conference.

**3) What remains to be done for this project? When will the project be completed?**

The core objective of the project is the international workshop in Berkeley. As mentioned above, it will take place on May 29-30, 2019 at the Institute for International Studies, UC Berkeley. Following the workshop we will evaluate the results for a possible publication.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The project is the outcome of an ongoing collaboration between Prof. Kondolf of UC Berkeley and Prof. Parrinello of Sciences Po (Paris) on the social dimension of sediment fluxes alteration in river systems. Every step of the project, from drafting the proposal to drafting the call for paper, from evaluating the abstracts to selecting and inviting the participants has been done jointly by the two PIs. The collaboration between Kondolf and Parrinello has already led prof. Kondolf to visiting Sciences Po in the spring 2018, in which occasion he intervened in prof. Parrinello's seminar in environmental history and led a field trip. The France-Berkeley Fund project will develop these exchanges further: the workshop in Berkeley will be the cornerstone moment of prof. Parrinello's planned visit to Berkeley in May 2019. The workshop, moreover, integrates two other scholars coming from French institutions, the University of Nimes and Université de Technologie de Compiègne, who will come to Berkeley on May 29-30, 2019. The larger collaborations which are part of the project and which have been consolidated in the preparatory workshop in Lyon in the fall 2018, includes also scholars from the Ecole Normale Supérieure de Lyon.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

We hope to publish the results of the workshop, either via the entirety of the presented papers or just a selected pool of them, as a special issue of a peer-reviewed journal such as Geomorphology, Water History, or Science of the Total Environment.

<b>Stephen LEONE</b> Chemistry, UC Berkeley	<b>Marino MARSI</b> Université Paris-Sud
<b>Attosecond dynamics in topological insulators</b>	
<b>Start date:</b> December 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The planning for the experiments and the collaborative work has been initiated between Professors Marsi, Leone, and a postdoc in the Leone group, Romain Geneaux. Information about ongoing experiments has been transferred to Prof. Marsi. The partners have focused on preparing the samples for the ultrafast studies, but there has been no trip of the French partners to Berkeley to perform the experiments yet.

This delay with respect to the original project timetable is mainly due to unforeseen constraints and obligations of prof. Marsi at his home institution. The first visit of prof. Marsi in Berkeley will take place in August/September. The partners would therefore like to ask for a six-month extension of the project.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

No money has been spent so far. We plan to spend the whole allocated amount (\$11,300).

**3) What remains to be done for this project? When will the project be completed?**

All the planned experiments are still to be performed. The project will be completed in May 2020.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The partners' expertise and knowhow are very complementary and this interdisciplinary project will naturally be very collaborative. The setups in S. Leone's laboratories offer unique capabilities for attosecond spectroscopy, thus presenting uniquely ideal opportunities for the development of this research project. Actually, the further development of these capabilities and their optimization

for condensed matter is one of the objectives of this project, where the candidate's experience in various spectroscopies for quantum materials will constitute an important asset for the host's group and will be beneficial also for other future experiments. Conversely, the experience gained by the guest and by the junior scientists in his group during their stay in Berkeley will be extremely beneficial for their future activity.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

The results of this project will be published in international scientific journals.

David LIMMER Chemistry, UC Berkeley	Benjamin ROTENBERG Sorbonne Université
Understanding energy storage in highly concentrated aqueous salt mixtures	
Start date: November 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

Once we received the notification of the award, we agreed to postpone its activation until November, 2018. This allowed us to better plan our joint work program and mutual visits supported by the FBF in 2019. However, the collaboration started remotely in 2018 via regular Skype meetings and a visit of a PhD student from the French group, Zhujie Li, in Berkeley in February 2018 (with a different funding source). These exchanges allowed progress on the first aspect of the project, namely the molecular simulation of "water-in-salts" electrolytes near graphite electrodes, in the framework of Z. Li's PhD (now finished) supervised by Mathieu Salanne. The first visit funded by the FBF took place in March 2019, when David Limmer visited Paris. Discussions on this first topic during his visit were also beneficial for the PhD project of Nidhal Ganfoud, related to aqueous electrolytes at electrochemical interfaces. Furthermore, a third PhD student, Laura Scalfi (who had done an internship in the Berkeley group in 2018), is now benchmarking the code developed in the Paris group for the classical molecular simulation of constant-potential electrodes (Metalwalls) against the one used in Berkeley (a modified version of a generic purpose MD software, Lammmps), which uses different periodic boundary conditions for electrostatics. D. Limmer's visit in Paris also allowed the start of another aspect of the proposal, namely the application of the statistical tools developed in the Berkeley group for the enhanced sampling of relevant trajectories to the case of electric transport in electrolytes. Our collaboration on this topic involves a PhD student in Berkeley (Chloe Gao) and a post-doc in Paris (Dominika Lesnicki). The latter is currently adapting the tools developed in Berkeley to the case of interest for this project. Discussions in Paris also resulted in promising directions for a new sampling method, based on out-of-equilibrium trajectories, which is now being further investigated in Berkeley. Overall, the late activation of the award allowed us to make significant progress while maintaining some flexibility to plan the

2019 visits at the most appropriate time for the success of this project (see section 3).

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

Spent:

- Visit of Pr. Limmer to Paris in March 2019: 3,000\$

Anticipated:

- Visit of Dr. Lesnicki to Berkeley in June 2019: 2,500\$

- Visit of Pr. Rotenberg to Berkeley in July 2019: 3,000\$

- Visit of Pr. Limmer to Paris in September 2019: 2,500\$

Pr. Salanne (Paris) will also visit the Limmer group during Pr. Rotenberg's stay in Berkeley, with a different funding source.

**3) What remains to be done for this project? When will the project be completed?**

Since the first aspect of the proposal (molecular description of electrochemical interfaces) is on track and can be continued remotely, we have decided to focus the remaining efforts on the second part (methodological developments for the sampling of transport properties). This is where the collaboration still requires frequent contacts and will benefit the most from mutual visits. To that end, it appeared that the most efficient way to ensure fast progress in this direction is that the post-doc working on this aspect in Paris, Dominika Lesnicki, visits the Limmer group (in June), where she will be able to interact on a daily basis with Pr. Limmer and his PhD student Chloe Gao. The next milestone in the project will be the joint visits of Pr. Rotenberg (with FBF support) and Pr. Salanne (with another funding source) to Berkeley in July, during which we expect to start writing at least one joint publication (see section 5) resulting from the collaboration. Pr. Limmer's last visit in September should provide an opportunity to finalize this/these publication(s) and to discuss new directions to extend the collaboration beyond the duration of the award.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

As put forward in our proposal, this collaboration involves one PI in Berkeley (Pr. Limmer) and two in Paris (Pr. Ro-



tenberg and Pr. Salanne), as well as many young researchers: 4 PhD students (Z. Li, L. Scalfi and to a lesser extent N. Ganfoud in Paris; C. Gao in Berkeley) and 1 post-doc who's main activity is directly related to this project (D. Lesnicki). These young researchers are actively involved in the exchanges, as Dr. Lesnicki will visit Berkeley in June, while C. Gao should visit Paris shortly during her stay in the UK in September.

During his visit in Paris, Pr. Limmer gave a seminar in the PHENIX laboratory and exchanged with other colleagues at Sorbonne Université. He also joined Pr. Rotenberg for the annual meeting of a European Training Network (NANOTRANS, on the transport of soft matter at the nanoscale), where he gave an invited lecture and had opportunities to exchange with other European colleagues, in particular the other French partners of this network (Lydéric Bocquet, Emmanuel Trizac). Pr. Rotenberg, who has already visited Berkeley in the past, will take the opportunity of his visit in July to engage in further discussions with other groups, in particular that of Phillip Geissler. Pr. Limmer's second visit in Paris could be an opportunity to meet with other French colleagues, in particular within the French Network on Electrochemical Energy Storage (RS2E).

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

Despite the late activation of the award, we can already anticipate that this project will result in at least two joint publications in high profile Physics, Physical chemistry or Chemical physics journals.

<b>Todd OLSON</b> History of Art, UC Berkeley	<b>Anne LAFONT</b> École des Hautes Études en Sciences Sociales
<b>Tabac/Chatbot: Education and Interaction in the Museum Exhibition</b>	
<b>Start date:</b> December 2018	

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

In addition to the chatbot, we intend to hold a seminar/workshop at UC Berkeley. An article of the relationship between AI and art history is also anticipated.

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The project has successfully evolved since its inception. Karine Douplitzky has been working with a software engineer in order to develop the chatbot program. We have been working with Anne Lafont on a bilingual prototype that would involve two institutions in France and California, respectively. Prof. Lafont will coordinate the implementation of the prototype at the Institut national d'histoire de l'art (INHA) Paris. Olson will be in conversation with Larry Rinder (Director, BAMPFA) about a parallel implementation. Plans have been initiated for conducting interviews for the content of the chatbot. One meeting has taken place in Paris with plans for a follow-up meeting in Berkeley.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

\$4000 for the software engineer.  
\$1000 for travel to Paris

**3) What remains to be done for this project? When will the project be completed?**

The chatbot be ready early this Fall and the development of the content (including translations) will be complete. We hope to initiating the use of the prototypes by January 2020.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The conversations between the graduate student and both professors has been meaningful. We anticipate future exchanges with the doctoral students at as well as a continuing relationship between UC Berkeley and the INHA.

<b>Eliot QUATAERT</b> Astronomy, UC Berkeley	<b>Benoit CERUTTI</b> Institut de Planétologie et d'Astrophysique de Grenoble
<b>Where General Relativity, quantum electrodynamics, and plasma physics meet: first-principles models of emission from astrophysical black holes</b>	
<b>Start date:</b> December 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

We are currently halfway through the project, a period within which the team has organized its first collaboration meeting (March 27-30). The team has also published its first article last January in the context of this collaboration. The fully general relativistic particle-in-cell (GRPIC) code is now complete and fully operational. To the best of our knowledge this is the only code in the world of this type with this capability. We performed the first ab-initio simulations of black hole spin extraction by magnetic fields in the form of a plasma jet (also known as the “Blandford-Znajek” process). To our great surprise, we discovered a significant amount of particles with negative energy as seen by a distant observer swallowed by the black hole which are effectively slowing down the hole and powering the jet. This process known as the “Penrose” mechanism can only be accurately captured with GRPIC simulations (or with any kinetic approach). Simulations have also clearly identified the role of magnetic reconnection as a means to accelerate particles to high energies within the innermost parts of black hole magnetospheres. This work should be seen as a proof-of-principle. We are currently working on more realistic plasma configurations for the simulations. B. Crinquand and B. Cerutti in Grenoble are currently implementing realistic electron-positron pair creation and gamma-ray production. K. Parfrey and A. Philippov are working on an initial thick disk model to feed the black hole with plasma. These efforts are particularly relevant in the context of the black hole imaging capabilities of the Event Horizon Telescope (EHT).

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

The first collaboration meeting was held in New York City in the Center for Computational Astrophysics, March 27-30 2019. This was the most convenient place to meet for all of us (Parfrey, Philippov and Quataert were all based in the area at this time of year). The airfares of the French team as well as the per diem were covered by the grant (about \$2000). We anticipate to spend most of the remaining (about \$9000) for our second collaboration meeting in Grenoble, planned in November 18-22, 2019.

**3) What remains to be done for this project? When will the project be completed?**

The two ongoing projects, namely, (i) pair and gamma-ray production, and (ii) collisionless accretion flow around black holes will be the main focus of the team until the end of the fund. We are currently running some of the final production simulations for project (i), and therefore we anticipate another publication before the next collaboration meeting. The second project is still in the exploratory phase but we anticipate significant progress on the initial conditions for the simulation before the end of the project. Note that the latter project was not initially planned but since we are ahead of our original projected timeline and given the context with the EHT images release of M87\* shadow, we chose to push even further our collaboration and include collisionless accretion physics.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

This collaboration has been extremely fruitful with frequent idea and code exchanges via a Slack channel, emails, video conferences, the March collaboration meeting, and a shared git repository. The team is willing to strengthen the links between these institutions and pursue our project over the years to come. On the French side, an ERC consolidator grant as well as a junior ANR research grant project have been submitted last February, they are currently under review. On the US side, Philippov and Parfrey are planning to apply for a NASA ATP grant.

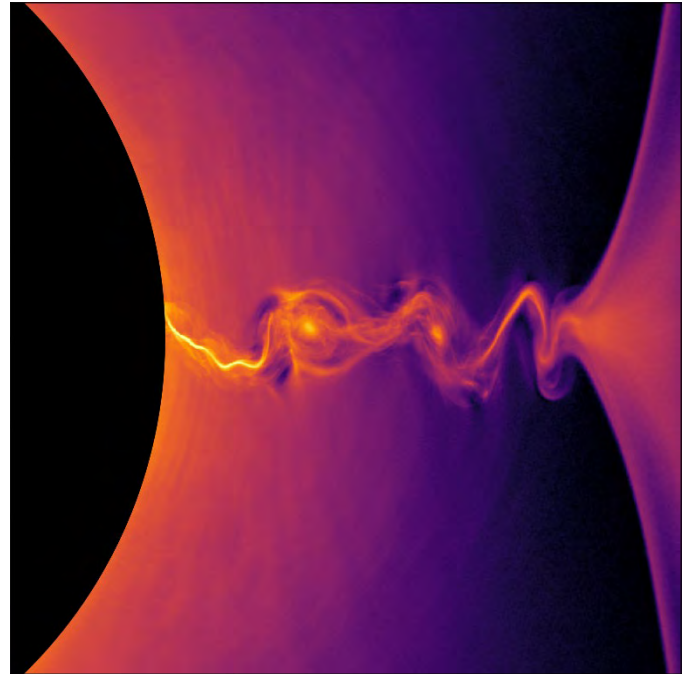
**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

Parfrey, K., Philippov, A., and Cerutti, B., “First-Principles Plasma Simulations of Black-Hole Jet Launching”, *Phys. Rev. Lett.* 122, 035101 (2019). This article was selected by

the editorial board as a research highlight and made the cover page of the journal. This work has been part of a press release at the LBNL and at CCA. Several scientific magazines have also dedicated a special news article to comment on the significance of this work, see APS Viewpoint, Nature, La Recherche. At least another article is expected to be published on pair creation by the end of the grant (B. Crinquand et al. in preparation).

Our work has been or will be presented in the following events:

- High-Energy Phenomena in Relativistic Outflows VII conference, July 2019, Barcelona, Spain.
- European Physical Society meeting, Plasma physics division, July 2019, Milan, Italy.
- CAMK colloquium, June 2019, Warsaw, Poland.
- Grappa colloquium at the University of Amsterdam, February 2019, Amsterdam, Netherlands.
- Gravity initiative seminar, March 2019, Princeton, USA.
- NASA Goddard workshop June 2019, USA.
- Workshop on plasma astrophysics, August 2019, Vienna, Austria.
- Gravity Seminar, University of Maryland, February 2019, USA
- Theoretical Astrophysics Program Colloquium, University of Arizona, February 2019, USA.
- Astrophysics Seminar, University of Illinois at Urbana-Champaign, March 2019, USA.
- Astrophysics Seminar, University of Chicago, May 2019, USA.
- GR22 / Amaldi13, Valencia, July 2019, Spain.
- Astroplasmas 2019, KITP, Santa Barbara, September 2019, USA.



<b>Venkatesan SUNDARESAN</b> Plant Biology, UC Davis	<b>Emmanuel GUIDERDONI</b> CIRAD Montpellier
<b>Synthetic apomixis in rice: Enabling hybrid seeds for smallholder farmers</b>	
<b>Start date:</b> October 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

The project has made substantial progress. The DNA vectors to induce parthenogenesis in hybrid rice have been completed at UC Davis and sent to CIRAD in France. CIRAD has initiated the transformations of these vectors into their hybrid rice plants. At the same time, the CIRAD group has been carrying out the additional manipulations that will eliminate meiosis and subsequent genetic segregation in their hybrid rice. For the synthetic apomixis in hybrids to be achieved, the vectors for inducing parthenogenesis from UC Davis will be combined with the manipulations at CIRAD to eliminate meiosis in the transgenic plants. It is expected that the first transgenic plants will be ready for analysis by the fall of 2019, at which time the exchange visit by the UCD scientist will take place.

The project is however behind the original timeline, in part due to technical hurdles that have now been largely overcome, and in part due to changes in personnel in the group at CIRAD. Consequently, the proposed visit by a researcher from CIRAD has also been rescheduled to later this year.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

No money has been spent thus far, as the exchange visits have not yet taken place. We anticipate that the visits, that are now planned for fall 2019, will utilize the entire budgeted amount.

**3) What remains to be done for this project? When will the project be completed?**

The main steps remaining are the analysis of the transgenic hybrid rice plants generated at CIRAD, and their progeny. It is hoped that we can demonstrate that they are able to reproduce as hybrid diploid plants, without genetic segregation and loss of hybrid vigour. Due to the in-

itial delays mentioned above, the project will be completed after the initial funding period, through an extension of the award which we hope will be granted.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

The project has resulted in closer ties between research at UC Davis and CIRAD, as manifested by multiple discussions over the past several months, that ranged from written communications to videoconference calls. Specifically, both the design and the execution involve components constructed at the two institutions that will be combined to reach the desired outcomes. Success in this project will undoubtedly lead to a longer term collaborative project, hopefully with funding from other sources.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

As stated above, we are still in the middle stages of the research, and have no results to report at this time. It is anticipated that if the project is successful, it will result in a publication in a major peer-reviewed international journal.

<b>Nicholas SWANSON-HYSELL</b> Earth & Planetary Science, UC Berkeley	<b>Yves GODDERIS</b> Observatoire Midi-Pyrénées, CNRS - Université Toulouse
<b>New paleogeographic models and the onset of a major glacial event in the Ordovician</b>	
<b>Start date:</b> July 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

Project research is actively ongoing with multiple productive trajectories. In summer 2018, Nicholas Swanson-Hysell and Berkeley PhD student Yuem Park traveled to Toulouse to conduct hands-on research with Yves Goddérís and his PhD student Pierre Maffre. During this time, Swanson-Hysell and Park gained hands-on experience working with Yves to apply the GEOCLIM modeling framework to begin to constrain the climatic effects of tropical mountain-building in the Ordovician Period — using a steady-state implementation of the modeling framework. Overall, the approach of the model is to combine climate models with models of the long-term carbon cycle to estimate CO<sub>2</sub> levels on the ancient Earth — with a particularly focus on the weathering of rocks that sequesters carbon. An exciting trajectory of model development that Goddérís and Maffre have pursued is to implement dynamic development of rock weathering profiles. In seeking to apply this model to the past, we realized that it was important to develop an implementation of the numerical modeling framework that incorporates differences in geology in addition to differences in climate (e.g. precipitation and temperature) and in slope. We have made significant progress in this regard wherein we are able to implement different rock types (lithologies) with different carbon sequestration potentials in the model. Iteratively, through passing code and results pack and forth between Berkeley and Toulouse we are calibrating the model and using it address questions in terms of the relative sensitivity of Earth's climate state to the presence of specific regions and mountain belts.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

We anticipate spending the full \$11,260 awarded through the grant. The 2018 summer research exchange cost \$3,569, an addition \$2,000 will support presentation of results and collaborative meetings at the European Geosciences Union meeting, with additional funds supporting project research and a research exchange to Berkeley in Fall 2019.

**3) What remains to be done for this project? When will the project be completed?**

PhD student Yuem Park here at Berkeley is continuing to develop the lithology-dependent implementation of GEOCLIM with a focus on using this version of the model to assess the relative importance of the Indonesia-region and its carbon sequestration potential to Earth's current glacial climate state. We are continuing to work on model development and model runs with communication between the research teams. Swanson-Hysell will travel to Vienna in April to present research results at the European Geosciences Union Annual meeting in an invited talk within a Union-wide symposia session being convened by Goddérís. This trip will enable additional meetings regarding research progress and plans. Swanson-Hysell and Goddérís are looking to convene a session on long-term paleogeography and its effects for the December 2019 American Geophysical Union Meeting in San Francisco. This trip will include collaborative work time at Berkeley during the week following the meeting.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

Project research so far has succeeded in establishing a new research collaboration between Swanson-Hysell and Goddérís. In addition, there were productive exchanges between Swanson-Hysell and other researchers at Géosciences Environnement Toulouse during the visit — particularly Mélina Macouin and Sonia Rousse. We, Swanson-Hysell and Goddérís, see significant potential for continuing to develop this collaborative relationship to continue into the future. This February, Swanson-Hysell submitted a research proposal to the National Science Foundation seeking to significantly extend this research trajectory. If

successful, this grant would fund a postdoctoral researcher working with Swanson-Hysell and Prof. Chiang in Berkeley's Geography Department (on climate modeling) while also being mentored by Godd ris. An ideal candidate for such a position would be Godd ris's PhD student Maffre.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**

Project results have been presented at the Geological Society of America Annual Meeting:

Swanson-Hysell, N. L., Macdonald, F.M., Park, Y.\* , Jagoutz, O. and Godderis, Y. Plate tectonic driven changes in planetary weatherability as the long-term control of Earth's climate state Geological Society of America Annual Meeting (2018)

And will be presented in an invited talk by Swanson-Hysell at the European Geosciences Union meeting in April, 2018. The research team plans to submit results using the new lithology-dependent implementation of the model this Summer for publication in the journal GEOLOGY.

<b>Alexander VON ROSPATT</b> South & Southeast Asian Studies, UC Berkeley	<b>Stéphane GROS</b> Center for Himalayan Studies, CNRS
<b>New Directions in Himalayan Studies</b>	
<b>Start date:</b> October 2018	

**1) What is the current status of the project? What has been achieved? How does this relate to the original projected timeline?**

This project's first aim was to invigorate Himalayan Studies on UC campus, building on the launch of a Himalayan Studies initiative two years ago, and the prospect of establishing a collaboration with the Centre d'Études Himalayennes at the CNRS (France). The main objective, in the framework of this project, was to host a three-day interdisciplinary workshop: the event took place on March 1-3, 2019 (in 370 Dwinelle Hall, UC Berkeley), and 20 presentations were included, half of them by doctoral students. This event brought together academics and graduate students from both institutions working on the Himalayan region in the Humanities and Social Sciences (geography, history, art history, anthropology, religious studies, environmental studies). (See attached program.) The event was also well attended by colleagues and students from UC Berkeley, and the public beyond campus. We have so far achieved our main goal, according to our project description and timeline, and it is our belief that this broadly configured workshop gave a significant impetus for further developing Himalayan Studies at UC Berkeley. It also has laid the groundwork for exploring more specific forms of collaboration and research partnerships between Berkeley and the Center of Himalayan Studies in the years to come.

**2) Indicate how much money has been spent to date. How much do you anticipate spending?**

Of the original \$11,300 grant received from the France-Berkeley Fund, a total of \$7651.31 has been spent so far to cover expenses for the March 1-3 Workshop. In the framework of this collaborative project, additional funding was also used to complement the FBF award: the partner institution (CEH-CNRS) contributed to the travel expenses for the French scholars, for a total amount of: \$6,140 (5,465€). The remaining balance of the France-Berkeley Fund award stands at \$3,648.69. We expect to

use this sum for the follow-up events and collaborative work as originally planned.

**3) What remains to be done for this project? When will the project be completed?**

To foster continuing relationship between the Centre d'Études Himalayennes and the Institute for South Asia Studies and its affiliated Himalayan Studies program, we are now planning a series of half-day events that will match two speakers (one UC professor, and one CNRS researcher) working on the same or closely related topics. The first such event is planned for the Fall of 2019, with Keiko Yamanaka (UCB) and Tristan Bruslé (CNRS), both specialists of migration issues in the Himalayas. We were not able to accommodate these two speakers in the workshop, and this event will help broaden our cooperation. We are also considering one or two similar events that will serve to consolidate the collaboration between participants of the March workshop (including students). It is our expectation that the project will be completed by the end 2019, although the collaboration between the two institutions is to continue beyond.

**4) Comment on the collaborative nature of the project. Highlight aspects of the project that have fostered continuing relationships between French institutions and UC campuses.**

As detailed in our original application, this collaborative project resulted from sustained exchanges over the previous year between the two grantees. The continuous presence of the latter on the UCB campus as a Visiting Scholar during the months prior to the planned Workshop allowed for a smooth coordination of the French and American teams. The workshop proved an effective tool to initiate scholarly exchange and cooperation between faculty and students of the Centre d'Études Himalayennes (who traveled from Paris to Berkeley for this) and UC Berkeley faculty and students with matching research agendas. The interdisciplinary workshop was organized in thematic panels that generated fruitful discussions among specialists, while also allowing for broader conversations with colleagues of different disciplines.

**5) Will this project result in a publication? (Indicate form of publication, if possible.)**



The participants of the panel on “Water Management” are planning an edited collection of abbreviated papers, and we are also exploring other possibilities of publishing select contributions to the workshop, held on March 1-3, 2019.



# **FINAL REPORTS**

**2017-18**

<b>Jeffrey BOKOR</b> Electrical Engineering & Computer Sciences, UC Berkeley	<b>Stéphane MANGIN</b> P2M, Université de Lor- raine
<b>Combining Spintronics and All Optical Magnetization Switching</b>	
<b>Start date:</b> December 2017	

**1) Describe the work accomplished, in relation to the original project description.**

The original project aimed at combining electrical and ultrafast optics for magnetic manipulation. The major goal, was to mature the young collaboration between Berkeley and the Institut Jean Lamour in France. On both of these fronts, scientific and collaborative, we are very happy with the results.

On the scientific aspects, we have developed together new types of magnetic structures embedded with ultrafast electrical switches. The motivation of the project is to better understand the physics of the interaction of ultrafast electrical currents with magnetic structures, and hopefully, to develop new ultrafast non-volatile memories. The knowledge of ultrafast photo-electric switch fabrication, usage and measurements, was brought by the Bokor group in Berkeley. The growth of the magnetic structures and the actual measurements have been carried at the Institut Jean Lamour. The goal with the first attempted structures was to trigger and detect the spin Hall effect at ultrafast timescales. In our first results we were able to detect magnetic precessions caused by these ultrafast spin Hall currents. This demonstration opens the door to a whole new way of performing ultrafast spin electronics. A paper is now being written.

In parallel, we have carried out collaborative studies on the all-optical magnetization switching in Tb doped GdCo alloys. The novelty of doping the samples with Tb is that the spin-orbit interaction, and thus the ultrafast dynamics of the well-known GdCo alloy, should change dramatically. We expect that these studies will reveal new insights into the underlying mechanisms of ultrafast all-optical magnetization switching. Samples were grown in Berkeley and preliminary optical experiments were carried there, demonstrating very different switching dynamics. Finally, a run at the synchrotron Bessy (in Berlin) was performed to study the ultrafast dynamics of each of the magnetic elements within the alloys, separately, thanks to the use of the synchrotron's X-rays. This data is still under

analysis, and according to the results a paper will be written. More experiment time at Bessy has also been requested.

On the collaborative aspects, various researchers and students have met and exchanged as a result of the fund. Professor Bokor visited the Institut Jean Lamour and Professor Mangin visited Berkeley. Professor Bokor, student Akshay Pattabi and researcher Jon Gorchon travelled to Berlin for the experiments at the BESSY synchrotron. Moreover, Akshay Pattabi, spent about a month at the Institut Jean Lamour to fabricate the photoswitches and help with the optical setup. During that time he was introduced to various new tools (VSM, FMR...). Finally, since writing the proposal for the FBF, both groups have engaged in lots of discussions and exchanges, which have resulted in the hiring of Professor Bokor's postdoctoral fellow Jon Gorchon at the Institut Jean Lamour as a permanent researcher.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Professor Jeffrey Bokor - Berkeley  
 Professor Stéphane Mangin - France  
 Professor Michel Hehn - France  
 Professor Gregory Malinowski - France  
 Professor Sayeef Salahuddin - Berkeley  
 Jon Gorchon - Postdoc @ Berkeley (until dec 2017) /  
 CNRS Researcher @ France (since dec 2017)  
 PhD student Akshay Pattabi - Berkeley  
 Postdoc Charles-Henri Lambert - Berkeley

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

-In preparation : "Time resolved picosecond spin-orbit torques determinants of bacterial interactions." We anticipate completing experiments for this project at the end of CY2019 or early 2020 and then will start writing manuscripts.

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

The project has allowed both groups to open up and exchange ideas. We have thus a number of ideas for future collaborations. Moreover, the materials growth capabilities from Nancy have been and will be very important for the collaboration. Finally, the deep knowledge in ultrafast physics, and thermal physics and the notoriety of Prof. Bokor and UC Berkeley has also been very helpful to Prof. Mangin's group. As a consequence of the interactions stimulated by FBF, Dr. Gorchon saw an opportunity to apply for a permanent research position in the institution of Nancy, and Prof. Mangin supported him. Dr. Gorchon was thus able to obtain this very competitive position. After 3 years with Prof. Bokor, he can now foster the collaboration between our two groups from Nancy.

Bokor travel to Nancy, Feb. 2019	\$ 4,169
Mangin travel to Berkeley, July, 2018	\$ 3,495
Pattabi travel to Nancy, Jan., 2019	\$ 2,393
Bokor travel to Berlin, Dec., 2018	\$ 1,066
<b>Total</b>	<b>\$ 11,123</b>

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

We will seek more funding to have some exchange students or co-advised PhD students. For example, local funding from France such as the Lorraine University of Excellence funds allow and encourage international co-advising of PhD students.

<b>Thomas COURTADE</b> Electrical Engineering & Computer Sciences, UC Berkeley	<b>Max FATHI</b> Institut de Mathématiques de Toulouse, Université Paul Sabatier
<b>Geometric and Functional Inequalities in Probability and Information Theory</b>	
<b>Start date:</b> September 2017	

**1) Describe the work accomplished, in relation to the original project description.**

This project systematically investigated certain functional inequalities in probability and information theory, and characterized various properties of interest (stability, dimensional-dependence, etc.). The class of inequalities we studied plays a fundamental role in many areas of mathematics, and enjoys applications in virtually all other quantitative sciences (e.g., engineering, computer science, physics, biology, and so on). This project focused in particular on log-Sobolev-type inequalities that exhibit “dimension-free” behavior, making them especially useful for analysis in high-dimensional settings that are characteristic of modern problems in statistics and data analysis. In addition to the scientific aims, this project was created in part to foster a relationship between the PIs’ respective institutions, achieved through both remote and in-person collaboration.

We have obtained new results on multiple topics, enumerated in detail in the publication list below. Two themes we highlight are the following:

-We have developed a functional-analytical perspective on the notion of Stein kernels, which is used to quantify how close two given probability distributions, and has found applications in theoretical and applied probability, statistics, geometry and data science. See publications [2] and [3] in the list below. Among concrete applications, we have obtained new bounds on the rate of convergence in the classical multi-dimensional central limit theorem, with better dependence on the dimension than previously-known estimates in a wide range of situations.

-We have investigated several problems dealing with stability of functional inequalities, such as the Shannon-Stam entropy power inequality in information theory, and the Bakry-Emery theorem on functional inequalities under convexity assumptions. In particular, in prepublication [6], we have developed a new technique, mixing Stein’s method from probability and calculus of variations to obtain stability estimates in variational problems in

spaces of probability measures. Among other things, this leads to dimension-free stability estimates for classical concentration inequalities for Lipschitz functions.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

- Thomas Courtade, Assistant Professor (co-PI)
- Max Fathi, CNRS junior researcher CRCN (co-PI)
- Fanny Augeri, postdoc
- Ashwin Pananjady, doctoral student

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

- [1] T. Courtade, M. Fathi, A. Pananjady. “Quantitative Stability of the Entropy Power Inequality”, IEEE Transactions on Information Theory, to appear.
- [2] T. Courtade, M. Fathi, A. Pananjady. “Existence of Stein kernels under spectral gap, and discrepancy bounds”, Annales de l’Institut Henri Poincaré : Probabilités et Statistiques, to appear.
- [3] M. Fathi. “Stein kernels and moment maps”, Annals of Probability, to appear
- [4] M. Fathi. “A sharp symmetrized form of Talagrand’s transport-entropy inequality for the Gaussian measure”, Electronic Communications in Probability,
- [5] T. Courtade. “Bounds on the Poincaré constant for convolution measures”, Arxiv preprint
- [6] T. Courtade and M. Fathi, “Stability of the Bakry-Emery theorem on  $\mathbb{R}^n$ ”, Arxiv preprint
- [7] M. Fathi, “Higher-order Stein kernels for Gaussian approximation”, Arxiv preprint

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

The main outcome of this collaboration has been many fruitful discussions on problems of mutual interest, as attested by the 3 co-authored publications. Our different point of views and backgrounds have been complementary and led to new theorems at the boundary of each other’s fields of expertise. The 4 single-authored works

also benefited greatly from this project, resulting in part from ideas spurred by the discussions among the PIs.

Collaboration is still ongoing, including preliminary results on some projects, and we expect to keep on working on the ideas developed during the course of the project in the coming years.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

The total project budget was \$11,400. This was spent consistent with the proposed project budget. Specifically, the majority of the funds was used to support travel for in-person collaboration at respective worksites, plus participant travel to various workshops for dissemination of project results:

\$1132.58: Postdoc travel support to MSRI program on geometric and functional analysis.

\$3805.26: Travel support for PI Fathi to visit UC Berkeley for project collaboration.

\$4101.73: Travel support for PI Courtade to visit Institut de Mathématiques de Toulouse for project collaboration; trip was co-timed to include visit to the University of Liege's workshop on modern mathematical methods in data analysis to present project results.

\$950.00: Open access charge for co-authored article in Annales de l'Institut Henri Poincaré : Probabilités et Statistiques.

\$788.72: Partial travel support to present results at Princeton University's 2018 Conference on Information Systems and Sciences.

\$621.70: Partial travel support to present results at American Mathematical Society's Fall Eastern Sectional Meeting.

T.C. obtained a grant from the NSF (CCF-1750430) to continue work along these lines. M.F. obtained funding from the French ANR JCJC program in 2018 (project MESA) for research in the continuity of this project, and which will allow to fund the PIs ongoing collaboration.

**“We found these funds to be a good catalyst to start our collaboration, and we anticipate that it will continue beyond the end of this funded project.”**

<b>Jacob DALTON</b> East Asian Languages and Cultures and South and Southeast Asian Studies, UC Berkeley	<b>Isabelle CHARLEUX</b> Groupe Sociétés, Religions, Laïcités, CNRS
<b>Points of Transition: Ovoo and the Ritual Re-making of Religious, Ecological, and Historical Politics in Inner Asia</b>	
<b>Start date:</b> July 2018	

**1) Describe the work accomplished, in relation to the original project description.**

The closed workshop was held February 20-21 at the Institute of East Asian Studies in Berkeley. At the end of the workshop, prospects for publication were discussed. Those who plan to move forward to publication will submit their finished work by September, 2019. The public conference was held February 22 in 180 Doe Library on the Berkeley campus. The public conference was filmed for distribution on the web, in order to make this work available to scholars in Inner Asia and the widely distributed scholars of this topic around the globe. The primary goal was to bring together a range of scholars in this area. Interaction and integration were paramount goals. Invitees combined emerging scholars and senior, distinguished faculty. The program was interdisciplinary, including scholars in history, anthropology, religion, even environmental science. Workshop presentations and conference presentations alternated French and American participants. At the workshop, within each panel, French discussants were assigned to present American papers, and American papers by French discussants, thus furthering the intimate familiarity with each other's work. It is hoped that this intense interaction over multiple days will encourage continued investment in one another's efforts and lead to an on-going working group on the topic and its wide-ranging implications in history and contemporary practice and understanding.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Sam Bass, PhD candidate, Indiana University  
 Brian Baumann, UC Berkeley  
 Isabelle Charleux, Professor, National Centre for Scientific Research

Bernard Charlier, Associate Professor, Université Catholique de Louvain  
 Jacob Dalton, Professor, UC Berkeley  
 Devon Dear, Independent Scholar, Harvard University  
 Grégory Delaplace, Associate Professor, Université Paris-Nanterre  
 Aurore Dumont, Post Doc, Academia Sinica  
 Kip Hutchins, Graduate Student, University of Wisconsin-Madison  
 Gaëlle Lacaze, Non Resident Analyst, Institute of Geo-Political Studies, Sorbonne Université  
 Laurent Legrain, Associate Professor, Université de Toulouse  
 Bolor Lkhaajav, Professor, University of San Francisco  
 Jessica Madison-Pískatá, PhD candidate, UC Santa Cruz  
 Anne-Sophie Pratte, PhD candidate, Harvard University  
 Marissa Smith, Instructor / PhD, De Anza College  
 Sangseraima Ujeed, Post Doc, UC Santa Barbara  
 Rebecca Watters, Independent Scholar, The Wolverine Foundation

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

The workshop concluded with a consensus to proceed to publication with a selection of the papers, with final versions to be submitted by September, 2019. Two options are currently under consideration: a double issue of Cross-Currents, a peer-reviewed publication produced at the Institute of East Asian Studies (<http://ieas.berkeley.edu/publications/cross-currents.html>), and/or Études mongoles et sibériennes, centrasiatiques et tibétaines (EMSCAT), the main French peer-reviewed journal on Inner Asia. The deadline for submission is September because it is expected that there may be two or three additional senior scholars invited to contribute to complete the range of papers on the topic.

Nearer term, one of the Mongolian participants has already written of this program for distribution in Mongolia on [Montsame](#).

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

Scholars specializing in this part of the work are a small group, widely distributed geographically and with limited opportunities for interaction. As mentioned above, this workshop and conference were structured to maximize interaction and integration, in hopes that a lasting relationship, such as an on-going working group that would produce joint research, public programs, and publication, would result. A future project discussed was developing a database of ovoo information and images.

5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?

Expenses:

Local accommodation for 4 nights for 10 participants.  
Reasonable economy airfare for 9 of the 17 participants.  
Airport transfers

Food and drink during the program

Filming the public conference

Of the above expenses, \$11,500 of our expenses are allocated to the grant from the France-Berkeley Fund.

These include:

\$4902.16 for airfares

\$551.00 for airport transfers (Bayporter)

\$6046.84 for food expenses (this includes group dinners at The Berkeley Faculty Club, Great China, Berkeley Social Club, and Angeline's; a conference lunch at the Women's Faculty Club; workshop catered lunches; and conference breaks and breakfast)

The other expenses, including accommodations, will be paid from other funds allocated to this program, including funds from the Institute of East Asian Studies and the UC Berkeley Mongolia Initiative. Exact amounts and accounting are available upon request.

**POINTS OF TRANSITION**  
**OVVOO**  
**AND THE RITUAL REMAKING OF RELIGIOUS, ECOLOGICAL, AND HISTORICAL POLITICS IN INNER ASIA**

**FEBRUARY 22**  
**9:30 AM - 6 PM**

**180 DOE LIBRARY**  
**UC BERKELEY**

Libraries in the landscape of contemporary Mongolia, Bayalal, Inner Mongolia, and Eastern Tibet (China), stewards of stoves or trees, covered with scarves, skulls, steering wheel covers, and a staggering array of other objects known as ovoos have long marked sites where ritual practices invoke the presence of immanent relations. Built and maintained by various publics, gatherings at ovoos have over past centuries been major sites of political action, where the identities and relationships between more and less local shamans, lamas, imperial officials, businesspeople, bureaucrats, politicians, and nomads are narrated, contested, and re-defined. While Mongolia struggles to assert itself on the world stage and lives of Mongolians are undergoing rapid change, the ovoos continue to represent not only a key aspect of traditional culture, but sites at the core of debates on development, ownership of land, mining industry, ecology, and the environment. This project brings together scholars from Northern California and from France to present research, develop new insights, and formulate research questions in the fields of anthropology, art history, East Asian Studies, and religion pertaining to political ritual in Inner Asia.

**SPEAKERS:**  
Sam Beca Indiana University  
Brian Baseman UC Berkeley  
Isabelle Charleux National Centre for Scientific Research  
Bernard Charlier University of Louvain  
Jacob Dalton UC Berkeley  
Devon Dair Harvard  
Gregory Delaplace Université Paris Nanterre  
Aurore Dumont Academia Sinica  
Kip Hutchins University of Wisconsin-Madison  
Dafne Lacaze Université Paris-Sorbonne  
Laurent Legrain University of Toulouse  
Bolor Lkhajiv University of San Francisco  
Jensica Madison UC Santa Cruz  
Anne-Ruthie Pratte Harvard University  
Marissa Smith De Anza College  
Sangeerama Upad UC Santa Barbara  
Rebecca Walters The Wolverine Foundation

With Support from the **France-Berkeley Fund**, **UC Berkeley Mongolia Initiative**, **Townsend Center for the Humanities**, and **Institute of East Asian Studies**.  
Free and Open to the Public. Wheelchair Accessible.





Ian DUNCAN English, UC Berkeley	Nathalie VANFASSE Aix-Marseille Université
<b>Form across literature and the sciences in Victorian Britain</b>	
<b>Start date:</b> September 2017	

### 1 ) Describe the work accomplished, in relation to the original project description.

The second phase of the project (2018-19) is now complete.

- A website is being maintained, as part of the “Decentered Disciplines” project at LERMA/Aix-Marseille, to showcase and record our collaborative research:
- <https://decentered.hypotheses.org/projet-france-berkeley>
- A second workshop, to follow last year’s workshop in Berkeley (May 3-6, 2018), took place at Aix-Marseille Université, LERMA, in the form of three study days. Here is the program, followed by a brief summary of the event.
- A record of the workshop via Twitter feed can be found at:
- [https://twitter.com/Decentered\\_amu](https://twitter.com/Decentered_amu)

Following last year’s event at UC Berkeley, we implemented a mixed format for participants at this year’s workshop in Aix, featuring formal conference-style readings of 20-minute papers, discussion of pre-circulated article-length drafts, and a series of round-tables featuring brief (10-minute) presentations followed by discussion. The heterogeneous format reflected the different career stages of the participants, ranging from first- and second-year students in the UC Berkeley doctoral program to advanced doctoral candidates in both our programs, along with postdoctoral students and faculty (at different professional levels) from both institutions – as well as, this year, a distinguished senior scholar, Michel Pierssens (Université de Montréal).

The conference-style sessions and the precirculated papers explored the intersection of questions of form across Victorian literature and a range of scientific disciplines; the roundtables reflected on the theory and practice of interdisciplinarity / transdisciplinarity and the current state of the field of nineteenth-century studies. The first session included papers on conceptions of monstrosity, drawn from nineteenth-century genetic theory, in the characterization of women in George Eliot’s novel

Daniel Deronda (Rudi Yiniguez), on agency and choice in the same novel in relation to emergent discourses of biological and social determinism (Veronica Mitnacht), and on discourses and technologies of anthropology practiced by Robert Louis Stevenson in the South Pacific (Kévin Cristin). The second conference session focused on technological mediations, whether imaginary – the shared aesthetics of Victorian poetry and Victorian mathematics (Imogen Forbes-Macphail) – or material: French radio adaptations of classic Victorian novels (Anaïs Martin), the relation between American civil war photography and Emily Dickinson’s poetry (Abigail Struhl). In the third conference session, Mary Mussman discussed Charlotte Brontë’s articulation of Lesbian codes of affect and performance in her novel *Villette*, Myriam Ardoin analyzed G.K. Chesterton’s invention of a literary analogue to his economic theory of “distributionism” in his *Father Brown* tales, and Katherine Hobbs considered the use of melodramatic techniques in feminist polemics by Anna Jameson. The final conference-paper session (the last of the workshop) featured two papers on Charles Darwin: one on islands and isolation as a formal device, as well as recurring theme, in Darwin’s evolutionary theory (Chris Geary), the other on the relations between instinct, aesthetic disinterestedness and human exceptionalism in *The Descent of Man*. Of the two pre-circulated papers, Emma Eisenberg’s drew on linguistic anthropology to reflect upon the interest in “milieu” as a bounded social field in Elizabeth Gaskell’s fiction following her sojourn in France; Gil Charbonnier’s analyzed the reception of Freud’s theory of sublimation in France in the 1920s, focusing on its repurposing as a theory of artistic creation in the writings of Valéry Larbaud.

The first of the four roundtables featured a discussion of selected Victorian “keywords”: “struggle-for-lifer” (Michel Pierssens, on the reception and ideological refraction of Darwin’s theory of natural selection in French literature and social theory in the late nineteenth century); “disbelief” (Jessica Ling, complicating modern critical assumptions about religion and literature in the Victorian era); “critique” and “criticism” (Jesse Cordes Selbin and Laura Ritland, tracing the genealogy of these closely connected but divergent concepts from 17th-century France up to our own time). For the second roundtable, Cécile Cottenet and Michel Van der Yeught offered salutary reflections on the opportunities and challenges of interdisciplinary work, with regard to the Aix-Marseille LERMA “Decentered Disciplines” project,

from the differing perspectives of book history / print media studies and English for Specific Purposes. In the third, Michel Pierssens introduced the critical method he founded in the 1990s, “épistémocritique,” and reflected on its attention to the active role of literature in producing – not just reflecting – philosophical and scientific knowledge; the discussion was facilitated by Fanny Robles and Claude Perez. The last of the roundtables featured a summary of current North American attempts to open up the field of Victorian studies to a global horizon (instantiated by British imperial expansion) and accounts of current French approaches to the field of nineteenth-century British literature, and interdisciplinary literary studies more broadly, by Fanny Robles and Nathalie Vanfasse.

A closing discussion highlighted some of the achievements of the workshop. Participants appreciated the mixed format and its capacity to engage doctoral students and faculty at different stages of their work and careers. UC Berkeley participants especially valued the opportunity to hear from their French counterparts, learning about French scholarly projects and approaches beyond the narrow range of what is available to Anglophone scholars in published translations, and experiencing a salutary defamiliarization of their field by viewing it through French perspectives.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

AMU:

Myriam Ardoin (postdoctoral student in English)  
 Gil Charbonnier (Associate Professor of French literature)  
 Cécile Cottenet (Professor of American studies)  
 Kevin Cristin (doctoral student in English)  
 Anais Martin (doctoral student in English)  
 Claude Perez (Professor of French literature)  
 Fanny Robles (Assistant Professor of English)  
 Michel Van der Yeught (Professor of English; ESP)  
 Nathalie Vanfasse (Professor of English)

UCB:

Ian Duncan (Professor of English)  
 Grace Lavery (Assistant Professor of English)  
 Jesse Cordes Selbin (doctoral student in English)  
 Emma Eisenberg (doctoral student in English)  
 Imogen Forbes-Macphail (doctoral student in English)  
 Christopher Geary (doctoral student in English)

Katherine Hobbs (doctoral student in English)  
 Jessica Ling (postdoctoral student in English)  
 Veronica Mitnacht (doctoral student in English)  
 Mary Mussman (doctoral student in Comparative Literature)  
 Jesse Nyiri (doctoral student in English)  
 Laura Ritland (doctoral student in English)

University of Montreal:

Michel Pierssens (Professor of French literature)

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

Prof. Grace Lavery’s pre-circulated paper on George Eliot, Freud and technique, presented at the May 2018 workshop, is forthcoming in the US journal *Critical Inquiry*.

As was the case last year, the workshop featured mixed formats and stages of work in progress, from conference-style papers to pre-circulated drafts of essays and articles. We are planning on approaching academic presses (e.g. Edinburgh University Press, Anthem) and/or journals (e.g. *Victorian Literature and Culture*) with a view to publishing a special issue or volume featuring revised selected papers.

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

Some of these aspects are mentioned above, in the summary of the May 2019 workshop. We feel, on both sides, that we have only just begun to open our minds to the approaches and achievements of our counterparts. For UC Berkeley participants, collaboration with French colleagues in a field of British literature affords a vital means of moving beyond our intellectual assumptions, correcting a kind of “provincialism of the center.”


We all look forward eagerly to continuing our collaboration beyond the formal bounds of the France-Berkeley grant. We hope to mount other joint workshops, with faculty and graduate students visiting each others’ institutions, although necessarily on a more modest scale; to participate in virtual conferences and discussions via Skype and other distance technology; to take advantage of the website, set up by the LERMA “Decentered Disciplines” team, as a forum for exchanging work in progress,

scholarly bibliographies, reviews of work in the field, information about lectures and other events at our campuses, and podcasts or video recordings of events of interest. We also plan on submitting proposals for joint sessions of the Aix-Berkeley workshop at international field conferences in Victorian and literary studies, in Europe, North America and Great Britain.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

Remaining monies from the France-Berkeley Fund award went toward covering travel and accommodation costs of UC Berkeley doctoral students who attended the workshop. The bulk of the funding for UC Berkeley participants, however, was contributed from endowed research funds attached to the Florence Green Bixby Chair in English, currently occupied by Prof. Duncan, who had pledged matching funds in the initial application. These funds also enabled the appointment of an administrative assistant, Jessica Ling, who coordinated travel and accommodation arrangements with Prof. Vanfasse at Aix. The Center for British Studies at UC Berkeley provided a modest supplement (\$1000) to assist travel costs for Berkeley PhD students. Aix-Marseille University contributed this year 7000 euros towards the organization of the workshop.

As regards future collaboration, Prof. Duncan is willing to continue the provision of funding from his endowed chair research fund, and both he and Prof. Vanfasse will look for resources from their home institutions. Prof. Vanfasse will especially look into funding possibilities related to Aix-Marseille University's national status as "Initiative d'Excellence". We are also developing collaborations with Germany where interesting research is being carried out around form across literature and the sciences from another European perspective.








**FORM ACROSS LITERATURE AND THE SCIENCES  
IN VICTORIAN BRITAIN**  
May 22<sup>nd</sup>-24<sup>th</sup> 2019

Convenors: Ian DUNCAN (UC Berkeley) and Nathalie VANFASSE (LERMA, AMU).

Organizing Committee: Cécile Cottenet, Ian Duncan, Fanny Robles, Michel Van der Yeught and Nathalie Vanfasse, with the help of Myriam Ardoin, Kevin Cristin, Jessica Ling and Anaïs Martin.

**Pôle multimédia, salle 2.08  
29 avenue Robert Schuman  
Aix-en-Provence, France**



<b>Alexei EFROS</b> Electrical Engineering & Computer Sciences, UC Berkeley	<b>Mathieu AUBRY</b> École des Ponts ParisTech
<b>Automatic exemplar-based correspondences discovery for Art History</b>	
<b>Start date:</b> July 2017	

**1) Describe the work accomplished, in relation to the original project description.**

We achieved the main goal described in our initial proposal. Namely, we developed a self-supervised feature learning strategy specifically tailored to match images across different depiction styles in a specific artwork dataset. We evaluated in details the benefits of our approach on the Jan Brueghel dataset. We also tested it on very different data, including historical photograph and modern paintings. Finally, we presented an approach to automatically discover repeated elements in a dataset. Extended results on different datasets are available on our project website:

<http://imagine.enpc.fr/~shenx/ArtMiner/>

and our code is publicly available:

<https://github.com/XiSHENo220/ArtMiner>

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

- Mathieu Aubry (researcher, École des Ponts)
- Alexei Efros (Professor, UC Berkeley, CS)
- Xi Shen (PhD student, École des Ponts)
- Shiry Ginosar (PhD student, UC Berkeley, CS)
- Elizabeth Honig (Professor, UC Berkeley, Art history)
- Tom Monnier (M2 student, École des Ponts)
- Taesung Park (PhD student, UC Berkeley, CS)
- Karan Dwivedi (undergrad, École des Ponts)

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

Discovering Visual Patterns in Art Collections with Spatially-consistent Feature Learning,  
Xi Shen, Alexei Efros and Mathieu Aubry,  
Proceedings IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2019

<http://imagine.enpc.fr/~shenx/ArtMiner/>

The Burgeoning Computer-Art Symbiosis,

Shiry Ginosar, Xi Shen, Karan Dwivedi, Elizabeth Honig, and Mathieu Aubry, XRDS: Crossroads, The ACM Magazine for Students – Computers and Art

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

More visits between the partners in Paris and Berkeley have happened during the project period than funded by the project. Alexei Efros will come to France in the coming year for the PhD defense of one of Mathieu Aubry students and for Mathieu Aubry's HDR defense. We are also working on an extension of our work focusing on fine image alignment, and plan to work in the fall with Elizabeth Honig toward an art history study of Brueghel's flower paintings.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

- Mathieu Aubry visit in Berkeley 2017: 3708.62\$

- Alexei Efros and Taesung Park visit in Paris 2018: 5621.92\$

- Xi Shen visit in Berkeley 2018: 1731.21\$

- Final project dinner 2019: 338.05\$

Total: \$11,399.80 (5,777.88 domestic and 5,621.92 foreign travel)

We have already obtained additional funding from ANR to continue working on this research topic (ANR JCJC Enhancing Heritage Image databases) We have also used different sources to fund Mathieu Aubry and Xi Shen visit to Berkeley in 2019, Mathieu Aubry visit in 2018 and Alexei Efros planned visit in 2019.



<b>Lisa GARCIA BEDOLLA</b> Graduate School of Education, UC Berkeley	<b>Marie MALLET</b> Université Panthéon-Sorbonne
<b>The Role of Social Assistance Programs in the Socioeconomic Integration of Immigrants A Comparative Study of Latino Immigrants in France, Spain, and the United States</b>	
<b>Start date:</b> August 2017	

**1) Describe the work accomplished, in relation to the original project description.**

We completed the data collection part for the project, and now have a database of 280 interviews in Madrid, Paris, San Francisco and New York city. These interviews have been transcribed for 3 of the sites. The transcriptions for the last site (New York city) are currently being transcribed, and the process should be completed by the end of December 2018. During the summer of 2018, the French PI drafted an academic article about some of the findings of the project. The American PI is currently revising the draft, and preparing it for publication in a special issue of the journal *California Journal of Politics and Policy*. The special issue will be published in late December 2018. During the 2018-2019 academic year, both PIs will continue to work on the publication of the results in academic journals, such as the *European Journal of Public Policy*, *International Migration Review* and *Ethnic and Racial Studies*.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Alejandra Regla-Vargas, Research assistant, doctoral student  
 Ignacio Deregibus, Research assistant, graduate student  
 Joanna Pinto-Coelho, Research assistant, post-doctoral researcher  
 Carolina Aguiar, Research assistant, graduate student  
 Edwin Garcia, Research assistant, graduate student  
 Tomas Jimenez, Associate Professor, Stanford University (co-PI of the France Stanford Fund project)

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

Mallet, M. and L. García Bedolla. 2018. "Transitory Legality: The Health Implications of Ending DACA." *California Journal of Politics and Policy*, forthcoming 2018. Appearing in the special issue entitled: "DACA Rescission in Context: Legal, Institutional, and Policy Implications."

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

The France Berkeley Fund allowed the French and American PIs to collaborate on this project. The French coordinator was able to spend 3 months on UC Berkeley campus at the start of the project and another 3 months at the end of the project to prepare the results for publication and to disseminate the findings through publications. Collaboration between the PIs has continued after the completion of the project. The preliminary results are promising, and the data collected represent a rich source of raw material that provides high potential for further analysis. We have already applied for additional funding, and we are planning on submitting at least one other grant application (ERC Starting Grant, 2019). One of the applications we submitted will allow us to organize one or two conferences in Europe and/or in California.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

A total of \$11,400 was spent, to pay for the following expenses:

- \$6,400 were used to pay for the travel and accommodation to conduct the fieldwork in Europe (Madrid and Paris).
- \$5,000 were used to pay 2 research assistants: Carolina Aguiar and Edwin Garcia.

Additionally, we used \$15,000 from the France Stanford Fund to cover additional expenses related to the fieldwork conducted in San Francisco and New York city, as well as to pay 3 additional research assistants.

We won funding from three additional institutions:

- The Madrid Institute of Advanced Studies offered a 10-month fellowship at the Casa de Velazquez to analyze the results of the project (2018-2019)
- The European Commission (H2020, MSCA-IF program) granted a 2-year fellowship at the Centre on Migration, Policy, and Society (COMPAS) at the University of Oxford to further develop the scope of the project (2019-2021).
- We also received a 8,000€ joint grant between the Casa de Velazquez and the Universidad Autonoma de Madrid to organize several meetings and conferences with the members of the research team

We also submitted the following applications to further develop the project:

- We are also planning on submitting an ERC Starting Grant in October 2019.

<b>Thomas GOLD</b> Sociology, UC Berkeley	<b>Sebastian VEG</b> Centre Chine, EHESS
<b>Sunflowers and Umbrellas: Social Movements, Expressive Practices and Political Culture in Taiwan and Hong Kong</b>	
<b>Start date:</b> March 2018	

**1) Describe the work accomplished, in relation to the original project description.**

The project consisted of a conference held at UC Berkeley on the topic of two important social movements that took place in Hong Kong and Taiwan in 2014, bringing together academics from Berkeley, France, as well as Hong Kong and Taiwan, and also scholars and graduate students from other institutions, activists, and artists who took part in the movements. The conference was held on 16-17 March 2018. A detailed conference report was appended to the interim report.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Weihong Bao, UC Berkeley, Associate Professor  
 Tze-woon Chan, Filmmaker (Hong Kong)  
 Edmund Cheng, Hong Kong Baptist University, Assistant Professor  
 Alex Chow, UC Berkeley, PhD student  
 Thomas B. Gold, UC Berkeley, Professor  
 Brian Hioe, Independent Scholar (Taipei)  
 Ming-sho Ho, National Taiwan University, Professor  
 Andrew Jones, UC Berkeley, Professor  
 Wai-man Lam, Open University of Hong Kong, Assistant Professor  
 Ching Kwan Lee, UCLA, Professor  
 Fei-fan Lin, London School of Economics, MA student  
 Ngok Ma, Chinese University of Hong Kong, Associate Professor  
 Chit Wai John Mok, UC Irvine, PhD student  
 Lev Nachman, UC Irvine, PhD student  
 Kevin O'Brien, UC Berkeley, Professor  
 Judith Pernin, National Library Taiwan, Associate doctoral graduate, French Centre for Research on Contemporary China  
 Ian Rowen, Nanyang Technological University, Assistant Professor  
 Sebastian Veg, EHESS, Professor  
 Jeff Wasserstrom, UC Irvine, Professor

Sampson Wong, Hong Kong Academy of Performing Arts, lecturer

Jieh-min Wu, Academia Sinica, Associate Research fellow

Guobin Yang, University of Pennsylvania, Professor

Mengyang Zhao, University of Pennsylvania, PhD student

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

We plan to publish a volume of conference papers. Berkeley's Institute of East Asian Studies Publications Series has expressed interest in publishing the volume in both book and electronic form. The book will be co-edited by the two project coordinators. Tentative title:

Thomas Gold, Sebastian Veg, eds., Sunflower and Umbrellas. Social Movement, Expressive Practices and Political Culture in Taiwan and Hong Kong.

8 papers have been submitted and the editorial process is currently ongoing.

Tentative table of Contents:

Introduction, Thomas Gold and Sebastian Veg

1. Edmund Cheng: Movement Leadership during the Sunflower and Umbrella Movements. Global protests and the rise of connective actions
2. Ming-sho Ho, Chun-hao Huang, Liang-ying Lin: The Sunflower Imagination: The Movement Perception and Evaluation from the Grassroots
3. Wai-man Lam: Othering and Hybridity: Political Identity and Political Radicalism in Hong
4. Lev Nachman: From Sunflowers to Suits: How Spatial Openings Effect Movement Party Formation.
5. Ngok Ma: The Plebeian Moment and Its Traces: Post-UM Professional Groups in Hong Kong
6. Brian Hioe: Visuality, Auality, and Spatiality in the Sunflower Movement. Precedents for Politics As Spectacle in Taiwan
7. Sebastian Veg: Music in the Umbrella Movement: From Expressive Form to New Political Culture
8. Judith Pernin: Protests and their representations in Taiwan and Hong Kong documentaries: the case of the Sunflower and Umbrella movements

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

Close collaboration at all stages between the project coordinators enabled the project to bring together different disciplines, different objects from Hong Kong and Taiwan, as well as different institutional networks in France and UC Berkeley. EHESS and Berkeley have a number of ongoing collaborations, but this is the first joint project in Asian studies. By involving graduate students from Taiwan and Hong Kong, we hope to encourage more circulation between Berkeley, EHESS, and institutions in those two territories. The two PIs continue to collaborate to bring the papers to publication.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

The full amount of the FBF grant has been spent for the March conference. Additional funding was raised from the Taiwan Economic and Cultural Office in San Francisco. We may consider applying for more funding to continue our collaboration in the future.





<b>Leslea HLUSKO</b> Integrative Biology, UC Berkeley	<b>Jean-Renaud BOISSERIE</b> Centre Français des Etudes Ethiopiennes
<b>A new collaboration focused on recently recovered evidence of human evolution from the Omo, Ethiopia</b>	
<b>Start date:</b> July 2017	

**1) Describe the work accomplished, in relation to the original project description.**

The main goal for our France-Berkeley Fund (FBF) award was to develop a long-term collaboration to learn about the evolution of our ancestors through the fossilized remains of the hominid dentition. The fossils we targeted our study on are newly-discovered by a French-lead field project in the Omo basin in southern Ethiopia lead by co-PI Dr. Jean-Renaud Boisserie. The award from the FBF supported two research trips that were needed to jump-start this collaboration. In accordance with our proposed project, we held our first research meeting in April 2019 in Addis Ababa. Hlusko, Boisserie, and Franck Guy (named as the third participant in our proposal) worked together in the National Museum for close to two weeks. During this time we collected primary data from the hominid teeth and conferred about our research approach and how this could articulate with a larger investigation of the stable isotopes from these and other fossils from the Omo. Our proposal also requested funds for a second research trip that was to be held at the University in Poitiers where Boisserie and Guy are currently based. In May of 2019, Hlusko spend a week in Poitiers. This time together enabled us to develop a much more specific plan for the follow-up research on these teeth. We sketched out ~4-5 research papers. For the first of these, we invited a colleague from Japan and another from Berkeley to collaborate. They agreed and we have scheduled our follow-up workshop to be held in Berkeley in April of 2020. After this workshop in early 2020, we will then pursue other manuscripts and set the dates for when they will be completed.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Dr. Jean-Renaud Boisserie (FBF award co-PI)  
Prof. Leslea Hlusko (FBF award co-PI)

Dr. Franck Guy, CNRS, University of Poitiers  
Dr. Camille Grohe (postdoctoral researcher, University of Poitiers)  
Extended participants (overlap in Addis and Poitiers, part of the larger project that will build on the FBF supported research:  
Dr. Gildas Merceron, CNRS, faculty at University of Poitiers  
Dr. Jeremy Martin, faculty at University of Lyons  
Dr. Kevin Uno, faculty at Columbia University  
M. GebreMichael, staff National Museum of Ethiopia  
Laurant Pallas, PhD candidate at University of Poitiers  
Dr. Rob Scott, faculty at Rutgers University  
Dr. Guillaume Daver, faculty at University of Poitiers

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

Paleontology is a slow science, and as such, we have laid the ground-work for multiple manuscripts but have not yet submitted any of these. The research plan is as follows:

- 1) Fall 2019 Guy and Hlusko will lead separate comparative studies identified as essential for the next step of the research.
- 2) Spring 2020 we will hold a workshop in Berkeley with Gen Suwa (University of Tokyo) and Tim White (UC Berkeley) to re-evaluate the taxonomy of the hominid teeth from the Omo (a project they were involved in over 15 years ago) and integrate the new Omo collections. This will result in a major publication targeted for the American Journal of Physical Anthropology.
- 3) The taxonomic study accomplished in #2 provides the platform for at least 4 manuscripts:
  - a. A test of the applicability of genetic research in Hlusko's lab group to the Omo hominid fossil assemblage.
  - b. An analysis of CT scans from the fossils (lead by Guy & Boisserie).
  - c. A test of a range of anatomical approaches to fossil data (1-2 manuscripts primarily lead by Guy).
  - d. A synthesis of hominid dental morphology with the isotopic analyses (lead by G. Merceron and colleagues).

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

An essential part of scientific collaboration is having communication, comradery, and trust. While Boisserie and Hlusko met in the field in Ethiopia almost 20 years ago, given that they are based in France and the US respectively, it had been difficult to build on this connection to develop a formal research collaboration. The time we both spend in Addis is greatly constrained by the funding for and timing of our other projects, and therefore, we never were able to dedicate the significant time needed to study the hominid teeth that the O.G.R.E. had discovered recently. Thanks to the FBF, we were able to pull Franck Guy into the project and specifically dedicate time to building the collaboration and figure out a solid plan for moving the investigation of these fossils forward. Paleontology, like all sciences, consists of a wide range of approaches. While Boisserie could see common ground between Hlusko and Guy, it was essential for us to sit down together and work through the collection side-by-side before we knew that there is significant overlap in our approaches. We have already set the next steps for a multi-year collaboration.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

The primary impediment to our collaboration had been in procuring funds to support the travel needed to study the fossils together as well as the cost of CT scanning some of the specimens. The majority of the F-B funds were spent on travel; a small portion enabled us to have time on major research equipment to scan some of the fossils (the CT scanner in Poitiers); and an even smaller amount was dedicated to purchasing other associated research supplies (computer drives to store the CT scans, glue and other supplies for the preparation, curation, and study of the fossils). We spent the full amount of the award.

We have planned ~4-5 manuscripts that will derive from the work facilitated by the FBF award. Most of these analyses can be done by comparing the data collected in Addis Ababa in April 2019 (supported by the FBF) with data we already have in-hand from previous projects. The results from this research will provide an essential platform from which we can pose new hypotheses that will be the foundation for large research proposals that request further support for the field research in the Omo

River basin. As Dr. Boisserie is the lead PI for the field program (the Omo Research Group Expedition), these proposals will largely be aimed at funding within the European Union. Given that funding agencies in the US and the EU support African paleontology from this time period primarily as a way of gaining insight to human evolution, our collaboration to move the study of the hominid fossils forward is essential to the larger research goals for the Omo Group Research Expedition.

**“We are very pleased with the progress made during these two research trips that would not have been possible without the support of the FBF.”**

<b>Paul KALAS</b> Astronomy, UC Berkeley	<b>Anne-Marie LAGRANGE</b> Université Grenoble-Alpes
<b>International search for moons and rings around the exoplanet Beta Pictoris b</b>	
<b>Start date:</b> October 2017	

**1) Describe the work accomplished, in relation to the original project description.**

Our project enabled collaboration between Berkeley and French scientists participating in the international research effort to monitor the nearby star Beta Pictoris as its giant planet passed in front of the star. This was a rare scientific opportunity since the transit event occurs only once every 22 years. The efforts included multiple PI's of various projects, including French campaigns using observatories in Chile and Antarctica, and Berkeley-led observations using the Gemini Planet Imager and the Hubble Space Telescope. Given the complexity of the projects and heterogeneity of the data, we arranged two face-to-face collaborative meetings supported by FBF that were extremely valuable.

First, we held a four-day workshop hosted by Observatoire Cote d'Azur in September 2018 ([http://univ-cotedazur.fr/events/beta\\_pic\\_2018\\_nice](http://univ-cotedazur.fr/events/beta_pic_2018_nice)).

This event included presentations and collaborative work between scientists from Berkeley, Paris, Genoble, and Nice. Everyone presented the current status of their data analysis in the first two days, and afterwards we broke up into several working groups where we planned ways to integrate our results into peer-reviewed manuscripts.

Second, Anne-Marie Lagrange visited Berkeley in March 2019 in order to make further progress in our understanding of the beta Pic planetary system. A particularly complex problem involved resolving discrepancies in the astrometry of the planet measured with the Very Large Telescope (France) versus the Gemini Telescope (Berkeley). It was during this visit where we created a plan to exchange our data and apply each group's data reduction and analysis techniques to the other group's data. We expect to present these results at The Spirit of Lyot meeting held in Tokyo, Japan, in October 2019.



**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Paul Kalas (Adjunct Professor)

Anne-Marie Lagrange (Directrice de Recherche classe exceptionnelle au CNRS)

Jason Wang (doctoral student and postdoctoral scholar)

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

Kalas, Paul, et al. (2019) The International Beta Pic b Transit Campaign, American Astronomical Society Meeting Abstracts #233.03.

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

Our project -- continuous observations of a planetary system to detect a rare astrophysical phenomenon -- requires planning, multiple types of expertise and resources,

and long-lasting collegial interactions. For the last 30 years, the French and US science teams have been working in parallel, but independently, on studying the Beta Pictoris planetary system. The 2018-2019 activities supported by the France Berkeley Fund were arguably the first time that the two groups worked as one team. In fact, this was the first time in their careers that Dr. Kalas had visited Observatoire Cote d'Azur and the first time that Dr. Lagrange had visited Berkeley. Beyond the specific research goals, these visits exposed each visitor to the many other scholars and facilities that make up each institution. The collaborative work established in Nice and Berkeley is continuing as of this writing. Our goal is to have our results ready for presentation at a meeting in Tokyo taking place in October 2019.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

The France-Berkeley funds were instrumental for supporting the international travel expenses of the project participants to each other's institutions, in addition to the conference events that took place at the Nice workshop. At the present time, we do not anticipate soliciting additional funds.

<b>Arash KOMEILI</b> Plant & Microbial Biology, UC Berkeley	<b>Christopher LEFEVRE</b> CEA/CNRS/Aix-Marseille University
<b>Uncovering the molecular mechanisms of greigite biomineralization in magnetic bacteria</b>	
<b>Start date:</b> December 2017	

**1) Describe the work accomplished, in relation to the original project description.**

Komeili's group has recently developed a genome editing method for the anaerobic magnetotactic bacterium *Desulfovibrio magneticus* RS-1. As BW-1, the greigite-producing bacterium central of this project, is closely related to RS-1 (16S rRNA and physiology), a similar approach is currently developed in Komeili's lab. Indeed in November 2018, the French partner visited Komeili's group to establish BW-1 culture techniques in this lab. Virginia Russell was taught all the techniques to grow BW-1 as well as the different conditions in which this strain produce magnetite and/or greigite. The development of the genetic techniques for BW-1 is ongoing.

During the visit of Christopher Lefevre in Berkeley, a field trip was organized for the sampling of greigite producing bacteria in the San Francisco Bay. During this trip we had the opportunity to find magnetotactic protists, similar to organisms that were central in a study conducted by the French partner. The magnetotactic protists found in the San Francisco Bay were then added to a publication (Monteil et al. 2019, Nature Microbiology) in which the FBF Funds was acknowledged.

The French partner also took advantage of his presence in Berkeley to meet with members of the Banfield group (Cindy Castelle, Project Scientist and Alexander Jaffe, graduate student). They established a promising collaboration since they have common interests in sharing metagenomic data from an ecosystem that hosts magnetotactic bacteria of interest.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Arash Komeili, Professor  
Christopher Lefevre, Researcher  
Matthieu Amor, Postdoctoral Scholar  
Virginia Russell, Graduate Student

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

Monteil CL, Vallenet D, Menguy N, Benzerara K, Barbe V, Fouteau S, Cruaud C, Floriani M, Viollier E, Adryanczyk G, Leonhardt N, Faivre D, Pignol D, López-García P, Weld RJ, Lefèvre C.T (2019) Ectosymbiotic bacteria at the origin of magnetoreception in a marine protist. *Nature Microbiology*, DOI 10.1038/s41564-019-0432-7

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

After the visit of the French partner, we evidenced that the complementarity of the expertise in molecular biology of Arash Komeili and in ecophysiology of Christopher Lefevre were clearly necessary for the development of such project. Although our FBF project is still ongoing, it reinforced the relationship between the two labs. In March 2019 both partners along with a Chinese expert in metagenomic (Wei Lin, Institute of Geology and Geophysics, Chinese Academy of Sciences, Beijing) submitted a proposal, untitled "Deciphering the genetic determinism that shapes biomineralized magnetic crystals" to the Human Frontiers Science Program (HFSP) Research Grants.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

American partner: trip to Paris to coordinate research and trip to Japan for magnetotactic bacteria conference  
French partner: 1 trip to Berkeley: flight and accommodation.

Additional outside funding for a related project were already asked in March 2019 with the submission of a proposal to the HFSP Research Grants (results of the 1st step evaluation will be in July)

<b>Lori LUBIN</b> Physics, UC Davis	<b>Olivier LE FEVRE</b> Laboratoire d'Astrophysique de Marseille, Aix-Marseille University
<b>Building the Giants: Cluster Formation and Galaxy Evolution over the Last 12 Billion Years</b>	
<b>Start date:</b> November 2017	

**1) Describe the work accomplished, in relation to the original project description.**

During the award period, the proposal teams conducted two in-person meetings, one held at LAM in February 2018 and one at UC Davis in July 2018. The funds from the FBF program were used to cover travel of two members each (including the coordinator) of the UC and French teams, respectively.

During these meetings, we completed: (1) the outline of the overall goals of this long-term program; (2) the plan to obtain new ground-based observations required to achieve these goals; (3) the focus of future large, multi-year NSF and NASA grant proposals; and (4) the list and content of our anticipated publications. As a result of these meetings and the subsequent work by the teams, we have submitted observing proposals for the Keck 10-m telescope, the Very Large Telescope (VLT), ALMA, and HST. In addition, the UC Project PI, with the French Project Coordinator Le Fevre as a collaborator, submitted 3-year grant proposals to NASA ADAP (declined) and NSF AARG (pending) to obtain additional funding for this project.

We have also completed three journal articles based on the existing data from this project. The first paper, which focuses on the massive proto-supercluster at  $z = 2.45$  and its expected evolution, was published in *Astronomy & Astrophysics* (Cucciati et al. 2018). The second paper, which measures the star formation rate – density relation at  $z \sim 0.9$ , has been accepted for publication in the *Monthly Notices of the Royal Astronomical Society* (MNRAS) [Tomczak et al. 2018]. The third paper, which focuses on the evolution in the quiescent fraction as a function of stellar mass, density, and redshift, has been submitted to MNRAS (Lemaux et al. 2018). The first paper was the subject of an international press release by ESO and UC Davis (see <https://www.ucdavis.edu/news/astronomersfind-cosmic-titan-early-universe/> and <https://www.eso.org/public/usa/news/eso1833/>) that was picked up by numerous US and European media outlets (see attached figure). We have also begun the theoretical

component of this program, which involves statistically associating cluster progenitors (from VUDS) to descendants (from ORELSE) by adopting the mean halo growth rate as a function of redshift and halo mass based on results from simulations (in particular the Millennium Survey). This component will be a crucial part of our future grant proposals.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Lori Lubin, Professor, UC Davis  
 Brian Lemaux, Associate Project Scientist, UC Davis  
 Adam Tomczak, Postdoctoral Scholar, UC Davis  
 Debora Pelliccia, Postdoctoral Scholar, UC Davis  
 Lu Shen, Graduate Student, UC Davis  
 Olivier Le Fevre, Astronome, LAM  
 Lidia Tasca, Postdoctorante, LAM  
 Olga Cucciati, Astronomer, Istituto Nazionale di Astrofisica (formally of LAM)

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

“The Progeny of a Cosmic Titan: A Massive Multi-Component Proto-Supercluster in formation at  $z = 2.45$  in VUDS” Cucciati et al. 2018, *A&A*, 619, 49  
 “Conditional Quenching: A detailed look at the SFR-Density Relation at  $z \sim 0.9$  from ORELSE” Tomczak et al. 2019, MNRAS, in press (arXiv:1812.04633)  
 “Persistence of the Color-Density Relation and Efficient Environmental Quenching to  $z \sim 1.4$ ” Lemaux et al. 2018, MNRAS, submitted (arXiv:1812.04624)

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

Our project was a close collaboration, with equal work on both the UC and French sides. Data analysis techniques were shared and perfected to ensure that we are making a robust comparison between the low and high-redshift samples. Moving forward, we already have a plan to take advantage of observational facilities currently available to us, as well as future missions such as JWST, in order to

further the science output from this project. As a result, we fully expect that this project will be long term, expanding to include new graduate students and postdoctoral scholars.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

All the funds were spent as originally proposed and were exclusively used to cover the travel expenses of two members each to the subsequent team meeting at LAM or at UC Davis. As noted in (1) above, we are actively seeking (and will continue to seek) outside funding, in particular from NASA and NSF but also from HST, to fund all or parts of this long-term research program.

<b>Roya MABOUDIAN</b> Chemical & Biomolecular Engineering, UC Berkeley	<b>Guillaume BAFFOU</b> CNRS, Institut Fresnel
<b>Plasmon assisted synthesis of ultra-precise designer nanoparticles</b>	
<b>Start date:</b> 2017	

### 1) Describe the work accomplished, in relation to the original project description.

The proposed project set out to study the effect of heating of plasmonic nanoparticles on driving ultra-precise chemistry at the nanoscale. This nanoscale chemistry, however, depends on several factors, each expected to affect the resulting nanoscale outcome in its own way. The work commenced by an initial trip from Berkeley to France (May 2017) to learn about the setup of Prof. Baffou at Institut Fresnel. During this trip, several nanoparticle samples were taken to study with the thermal camera set up of the Baffou Group. Two goals were accomplished in this phase: 1- Learning how to position the sample in a liquid environment using a confocal petri dish on this custom-built microscope, and 2- Measuring the thermal heating profiles (how hot the nanoparticles get) in both an aqueous environment and in glycerol. It has been shown that in an aqueous environment, the particles can get as hot as 200 degrees C, without any visual evidence such as bubble formation around the particle. This temperature can be several hundred degrees C, in the case where the particles are suspended in glycerol. The setup at the Baffou Group is capable of measuring these extreme nanoscale temperature changes, using a phase-front sensing camera setup coupled with the laser system used for heating of the nanoparticles.

A second visit took place (July 2018) from Berkeley to France where gold nanoparticles of different aspect ratios were taken to be studied by the newly designed and upgraded version of the microscope at the Baffou Group. This microscope is connected to a Ti:Sapphire laser source, where the wavelength of the excitation laser (causing the heating) can be changed from the previously fixed wavelength. Additionally, this laser was capable of operating both in continuous wave (CW) mode as well as in the short-burst femtosecond mode. During this visit, the effects of femtosecond mode excitation as well as the use of other chemical precursors such as  $\text{LaCl}_3$  were studied.

The idea inception was in collaboration with the University of Toronto, and through this interaction, the

high-resolution imaging of the nanoparticles resulting from the experiments in France were conducted at the Nano-imaging facilities there.

### 2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.

Roya Maboudian, Professor, UC  
Carlo Carraro, Adj. Professor, UC  
Guillaume Baffou, Professor, France  
Arthur Montazeri, Postdoc, UC  
Hadrien Robert, Postdoc, France

### 3) List all publications resulting from this project. Include journal titles and issues/dates.

The data collected are currently being analyzed. We expect that if the femtosecond measurements show a different chemistry or nanovest formation, the results will be of extreme interest to the community and will be published.

### 4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?

Both the French and the UC groups are interested in the chemistry enabled by surface plasmons at the nanoscale. The UC Group is experienced and interested in the chemistry and the French Group is interested and experienced in nanoparticle-light interaction and specifically in quantifying the heat produced as the result of the plasmonic activity of the nanoparticles. At the cross-section of the two, this project attempts to bring together the chemistry at the nanoscale while gaining a better quantitative understanding of the amount of heat generated against the amount of heat necessary to induce chemical reactions. In the femtosecond regime, this finely balanced thermal exchange is time-gated against heat diffusion. This common ground of chemistry and controlled heat generation in nanoparticles exposed to laser light was the basis of our collaborative effort and the continued work toward analyzing the data generated during the visit by the UC group participants at the French group's facility. Our further collaborations will largely hinge on the joint



data analysis and interpretation of the results against our working hypotheses.

5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?

The funds were used for the materials and supplies employed in the synthesis and storage of the nanomaterials, and travel expenses of the postdoctoral scholar from the UCB group to the facilities of the French group and to the Nanoimaging facilities of the University of Toronto.

Once the data thus-obtained are analyzed, we will aim to pursue additional funding, e.g., through International Collaboration programs solicited by the National Science Foundation.

**“The France-Berkeley Fund was instrumental in enabling this joint collaboration. The two visits, even though short in duration, enabled us to carry out the initial experiments to help quantify the qualitative results previously obtained independently by the two groups. We are much grateful for this opportunity.”**

<b>Mairi MCLAUGHLIN</b> French, UC Berkeley	<b>Benjamin FAGARD</b> CNRS / ENS / Sorbonne Nouvelle
<b>French in Comparison: The Comparative Approach from Historical Linguistics to Language Pedagogy</b>	
<b>Start date:</b> December 2017	

**1) Describe the work accomplished, in relation to the original project description.**

We used the funds as planned to run a joint workshop in April 2018. The workshop was split into two parts: a one-day public workshop and two days of meetings for the teams from Lattice and UC. Over the course of three very intensive days we were able to share our expertise on the linguistic facts and determine how to move forward with a long-term collaborative project.

Since the workshop, members of both of the institutions have been working together to design three online tools for advanced learners of French. Most of this work has been done remotely but Mairi McLaughlin visited the Lattice lab in November 2018 in order to work together in person. One of the tools has already been launched in beta version, the other two are in development.

I have been involved in FBF projects before and I think that a real advantage of this one was using the money to bring the whole team together for a long time in one location rather than trying to organize two shorter trips for smaller numbers of people. This is one of the most successful collaborations that I have been involved in so I am immensely grateful to the France-Berkeley Fund for helping us get it off the ground.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Faculty: Shirley Carter-Thomas, Benjamin Fagard, Sophie Prévost, Laure Sarda, Mairi McLaughlin, Justin Davidson, Rick Kern

Lecturers: Seda Chavdarian, Vesna Rodic

Ph.D. students: Brock Imel, Rachel Weiher, Kathryn Levine, Elyse Ritchey

Many other people attended the workshop.

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

This is the website for the first tool, in beta version as of January 2019:

<http://apps.lattice.cnrs.fr/dislocated/>

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

This project has been very much collaborative. Together, teams from Berkeley and Lattice planned and participated in a joint workshop in April 2018 and we have continued to work together since then. There is a large group of stakeholders and also smaller groups involved in each of the different tools. We are continuing to work together now even though we have no more funding from the France Berkeley Fund. We are using funding that Laure Sarda got on the back of this collaboration and we will apply for more funding in future. It is not possible for one team or the other to pursue this project because we have very complementary resources: LaTTiCe has engineers to develop the tools, we both have linguists, and Berkeley has instructors of French to guide the development of the tools and the classrooms in which to test them.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

As planned, the bulk of the funding was used to bring linguists and engineers from the Lattice lab to UC Berkeley for a three day workshop. The remaining funds were used to pay a graduate research assistant to help run the workshop and another graduate assistant to carry out research to support the development of the tools.

Workshop expenses (flights, hotels, meals): \$10,400

Graduate research assistant hours: \$450

McLaughlin's travel to Paris (Eurostar, hotel, meals): \$550

Alongside France Berkeley Fund money, we have been using research funds at Berkeley and support won by Laure Sarda in France to continue the collaboration.

<b>Holger MULLER</b> Physics, UC Berkeley	<b>Saida GUELLATTI-KHELIFA</b> Université Pierre et Marie Curie
<b>LKB-UCB consortium on fundamental constants</b>	
<b>Start date:</b> January 2018	

### 1) Describe the work accomplished, in relation to the original project description.

This grant has led to major progress in the field of precision measurements of the fundamental constants of nature. Such measurements can often be done with methods from across subfields of physics and are thus powerful tests of the consistency of theory and experiment in across physics. Making comparisons among such precision measurements can even probe physics beyond the standard model and may perhaps uncover signatures for dark matter in the laboratory.

UC Berkeley and Laboratoire Kastler-Brossel are the two places in the world that made the most accurate measurements of the fine-structure constant. Collaboration between the groups has accelerated progress. This collaboration has been enabled by the FBF.

The collaboration started when the Berkeley Coordinator, Müller, visited LKB in December 2017 and thereby learned about a systematic error caused by small-scale distortions of laser beams. The LKB team had investigated this effect for a long time. Continued exchange of knowledge, made possible in part by this grant, has allowed the two teams to devise strategies to minimize this effect.

As a milestone, the UCB group has published the most accurate measurement of the fine structure constant to date (Parker 2018; Yu 2019). This included an analysis of the above effect and is therefore an example for the success of the FBF-funded activity.

Later, LKB graduate student Leo Morel visited Berkeley in June 2018, where he worked on the Berkeley project on a day-to-day basis. The Berkeley and LKB teams use different laser technologies, so FBF allows us to learn from each other. At Berkeley, Leo helped us to switch a new laser between two different frequencies separated by ~20GHz. Tricks like this can make one laser do the work of two, and thus significantly simplify setting up future measurements.

The Berkeley coordinator, Holger Müller, spent a month working at the Guellati-Khélifa group at Laboratoire Kastler-Brossel in Fall of 2018. In particular, the two teams discussed the future of measurements of  $h/m$  and the fine structure constant, and the systematic error arising from small-scale distortions of the laser beam.

Working together in laboratory at LKB, we found that a laser beam, when it exits an optical fiber, has relatively strong small-scale distortions that would lead to systematic effects of several parts per billion (ppb), which need to be addressed if measurements are to advance below 0.1 ppb. We found that after propagation of the beam for several meters, these distortions are sufficiently suppressed. Future experiments both at Berkeley and LKB will be designed with ample space for such propagation. These studies were included in additional publications of both teams (Yu 2019; Cladé 2019).

### 2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.

Berkeley:  
Holger Müller, Associate Professor, University of California, Berkeley

LKB:  
Saida GUELLATI-KHELIFA, Laboratoire Kastler Brossel (CNRS UMR8552) (Université Pierre et Marie Curie-École Normale Supérieure-Collège de France)

Leo MOREL, Laboratoire Kastler Brossel (CNRS UMR8552) (Université Pierre et Marie Curie-École Normale Supérieure-Collège de France)

### 3) List all publications resulting from this project. Include journal titles and issues/dates.

Cladé, Pierre, François Nez, François Biraben, and Saïda Guellati-Khelifa. 2019. "State of the Art in the Determination of the Fine-Structure Constant and the Ratio  $H/\mu$ ." *Comptes Rendus Physique*.  
<https://doi.org/10.1016/j.crhy.2018.12.003>

Parker, Richard H., Chenghui Yu, Weicheng Zhong, Brian Estey, and Holger Müller. 2018. "Measurement of the Fine-Structure Constant as a Test of the Standard Model." *Science* 360: 191–95.

Yu, Chenghui, Weicheng Zhong, Brian Estey, Joyce Kwan, Richard H. Parker, and Holger Müller. 2019. "Atom-Interferometry Measurement of the Fine Structure Constant." *Annalen Der Physik* 38: 1800346.

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

The collaboration involved mutual visits and has led to major acceleration of the work on both sides. In particular, the UCB team has published a measurement of the fine-structure constant enabled, in part, by experience gained when Müller visited the LKB team in Paris. Likewise, the LKB team has recently started a new measurement campaign that might lead to a new result by December 2019. This has been using ideas developed collaboratively during Müller's visit in Paris.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

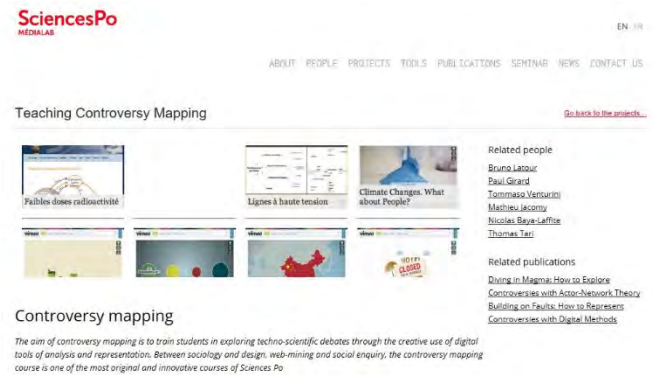
The FBF award was spent on travel and lodging expenses for mutual visits. On the Berkeley side, we have indeed been able to attract major new funding for this project that will help us to continue the work as well as the collaboration. Such funding is from the National Institute of Standards and Technology (the LKB team has a similar grant), as well as the National Science Foundation, and totals ~\$850k. The collaboration enabled by the FBF was a factor in attracting this funding.

<b>Saul PERLMUTTER</b> Berkeley Institute for Data Science, UC Berkeley	<b>Bruno LATOUR</b> MediaLab, Sciences Po
<b>Mapping controversies and conspiracies: Exploring conceptual boundaries and pedagogical practices</b>	
<b>Start date:</b> July 2017	

### 1) Describe the work accomplished, in relation to the original project description.

This project realized through an innovative collaboration exchange of ideas between the Berkeley Institute of Data Science (BIDS), the Center for Science Technology, Medicine and Society (CSTMS) at University of California Berkeley and the SciencesPo Media Lab, Paris. The objective of the project was to shared new methods and computational tools for educational and research purposes developed by BIDS and the SciencesPo Media Lab, building on the UCB. Big Ideas course developed by Saul Perlmutter at UCB and the Mapping controversies framework developed by SciencesPo. Our initial objective was to create a space of discussion to share tools and methods and reflect on the ways in which we differently approach critical thinking in digital scientific environments.

In many ways, the project went beyond its initial conceptualization. As envisioned in the original grant proposal two workshops have been organized, one in Paris and one in Berkeley. Starting from a focus on digitalization of education, the project has progressively morphed into a more integrated collective reflexion on the modalities, challenges and opportunities of the digitalization of practices in social sciences and humanities. During each workshop the visiting group had an opportunity to get acquainted with local institutional organization of the disciplines and reflect on the material and immaterial infrastructures needed to create research and educational for digital scholarship. Working with different format (workshop, demos, round tables, scientific walks, public presentations and also informal dinner and lunches) the participants had ample time to discuss in depth their tools, methods and work organizations, and how they are structuring these emergent data centric research and education fields.



### 2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.

FBF Berkeley workshop

May, 2, 3, 4 2018

UC Berkeley

- Claudia von Vacano, Executive Director, D-Lab and Berkeley Digital Humanities
- Margarita Boenig-Liptsin, Research Associate at Harvard STS, co-instructor (with Cathryn Carson) of the Human Contexts and Ethics of Data class.
- Morgan Ames, Interim associate director of research CSTMS
- Shreeharsh Kelkar, Teaching Faculty, Interdisciplinary Study Field
- Stuart Geiger, Researcher BIDS (Information, Communication, STS)
- Charlotte Mazel-Cabasse, Researcher BIDS (Ethnography, Geography, STS)
- Chris Holdgraf, Data Science Fellow at the Berkeley Institute for Data Science and a Community Architect at the Data Science Education Program at UC Berkeley.
- Joseph Klett
- Melissa V. Eitzel Solera - Researcher
- Petra Benyei, Visitor at BIDS (from ICTA-Barcelona, citizen science and ethnoecology)
- Rebecca C. Fan, Postdoctoral Visiting Scholar, Institute for the Study of Societal Issues (ISSI)

UC Santa Cruz

- Dennis Browe, doctoral student, Third Street Project (Sociology)  
Science History Institute (formerly Chemical Heritage Foundation)

- Joseph Klett, PI Community History Platform and Seeing Like a Valley

- Jody Roberts, Director, Institute for Research

FBF Paris workshop  
March, 6, 7, 8 2018

Sciences Po

- Nicolas Benvegno - Forccast Director
- Thomas Tari - Teaching Professor
- Paul Girard - Director - Technical lead
- Jean-Philippe Cointet - Associate Professor
- Benjamin Ooghe-Tabanou Research Engineer
- Guillaume Plique Research Engineer
- Robin de Mourat Designer
- Mathieu Jacomy Research Engineer
- Dominique Cardon Professor
- Mengying Du Graduate Student

UC Berkeley

- Claudia von Vacano, Director, D-Lab and Berkeley Digital Humanities

- Stuart Geiger, Researcher BIDS (Information, Communication, STS)
- Charlotte Mazel-Cabasse, Researcher BIDS (Geography, STS)

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

None, the project was not designed for that purpose.

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

Both visits were highly collaborative and, allowing designers, engineers and researchers and professor to discuss their practices and projects. Because of the very diverse nature of the projects we had designed series of workshop or public interventions that were very successful.

Future collaborations between all members of the workshop are in discussion around question of reproducibility in the social sciences and humanities.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

<b>Budget</b>	
<b><i>Berkeley seminar</i></b>	
Travel (three travelers)	
Airfares from Paris	4,000
Ground transportation	150
Hotel (2 nights)	800
Seminar	
(15 participants)	
Breakfast	Covered by Bids/CSTMS
Lunch	Covered by Bids/CSTMS
Break	Covered by Bids/CSTMS
Dinner (8 participants)	
<b>Berkeley Total</b>	<b>4,950</b>
<b><i>Paris seminar:</i></b>	
Travel	
(four travelers)	
Airfares from San Francisco	5,000
Ground transportation	150
Hotel (2 nights)	800
Seminar	
(15 participants)	
Breakfast	75
Lunch	250
Break	75
Dinner (10 participants) Tax	700
<b>Paris Total Grand Total:</b>	<b>7,050</b>
<b>TOTAL</b>	<b>12,000</b>

<b>Carla SHAPREAU</b> Music, UC Berkeley	<b>Christine LALOUÉ</b> Musée de la musique / Cité de la musique, Philharmonie de Paris
<b>The Economic, Social, and Political World of Violins in the Pre-War and World War II Eras: Bridging the Archival Gap Between the Musée de la Musique and the Smithsonian Institution Collections</b>	
<b>Start date:</b> October 2017	

**1) Describe the work accomplished, in relation to the original project description.**

The objectives for this France-Berkeley Fund project were to research and analyze international commerce involving instruments of the violin family during the pre-war and World War II eras in order to determine how the Nazi era may have impacted the evolution of transactions, including possible ramifications to those who were persecuted during the Nazi era. This investigation focused, in part, on social, economic, geographic, and political factors during the period under study in the context of the transactional network between experts, dealers, musicians, teachers, collectors, suppliers, and others. Core to this inquiry were the musical instruments, often rare, including their description and evidence of authenticity, provenance, condition, and valuation. Much international historical research has been conducted on the topic of Nazi-era looted art, but very little research has been undertaken on the subject of musical losses sustained as a result of looting or transactions involving both purchases and sales made under duress. This project is the first attempt to systematically analyze this topic through the lens of one major dealer -- the Parisian violin workshop, Caressa & Français, which engaged in instrument making, repairs and restorations, the provision of supplies, expert appraisals and certifications, purchases, consignments, and sales.

The primary source records consulted in this study, once one record collection, are today divided between the Musée de la musique in Paris and the Smithsonian Institution Archives Center, National Museum of American History in Washington, D.C. This France-Berkeley Fund grant made it possible to rejoin these records through their documentation and study. The grantees analyzed these archival records spanning the years 1930-

1945. Each document was photographed and a transcription of the data was entered into structured format that allowed data analysis and interpretation on both a macro and granular level. The data gleaned revealed significant measurable information, trends, and noteworthy case studies. The results of this study have potential relevance to ongoing and future research involving related historical record collections. We met our stated research aims under the France-Berkeley Fund project description and our findings will soon be published, as discussed below.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Carla Shapreau, J.D.  
Curator, Salz Collection of Stringed Instruments, Department of Music  
Lecturer School of Law; Senior Fellow, Institute of European Studies  
University of California, Berkeley

Christine Laloué  
Chief curator, archives funds and harpsichords  
Musée de la musique

Jean-Philippe Echard, Ph.D.  
Curator, bowed stringed instruments  
Musée de la musique

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**3) List all publications resulting from this project. Include journal titles and issues/dates.**

Research findings will be published in an article titled, "Documenting the Violin Trade in Paris: The Archives of Albert Caressa and Émile Français, 1930-1945," in *Collecting & Provenance: A Multi-Disciplinary Approach*, eds. Jane Milosch and Nick Pearce, Roman & Littlefield Publishing Group (forthcoming 2019). Our contribution to this book project was under an agreement with the Smithsonian Institution on behalf of its Smithsonian Provenance Research Initiative. Research findings resulting from this project are also expected to be utilized in future publications.

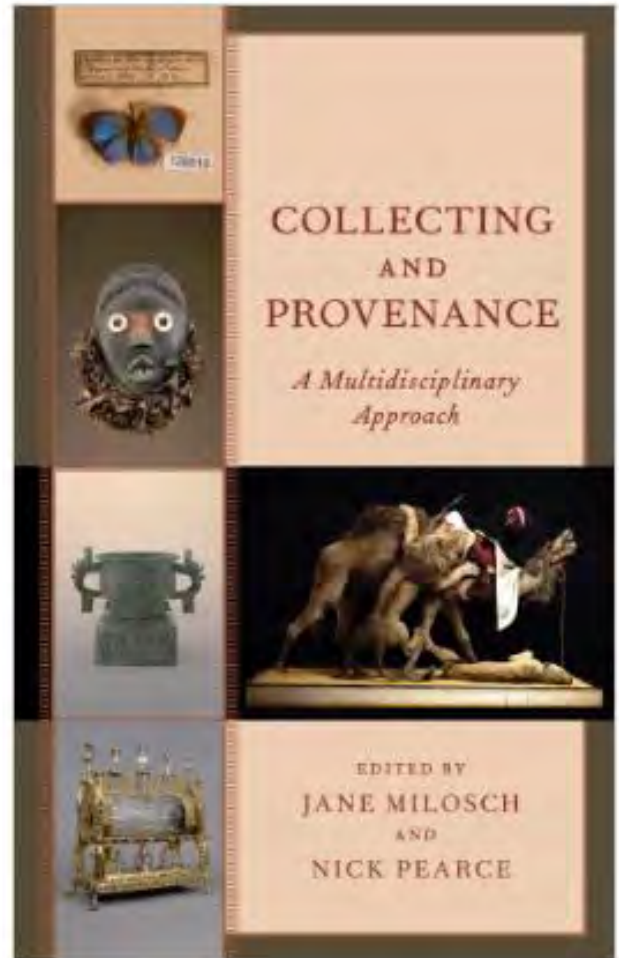
**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

This France-Berkeley Fund project fostered effective collaboration by all members of the research team. The grantees worked onsite with the primary source records for one week at the Musée de la musique and for two weeks at the Smithsonian Institution Archives Center. We collaborated on the review, analysis, and interpretation of the information and we jointly prepared our research findings. Our ongoing discussions also took place in the course of several telephonic and email communications. Each participant in the project contributed distinct and complimentary expertise. In addition to our collaboration, we engaged in discussions with others at French and U.S. institutions, including other scholars at the Musée de la musique, consultations with Alain Prévet and Thierry Bajou of the Ministère de la Culture and with Florence de Peyronnet-Dryden, Archives nationales. Further collaboration may result as research evolves using the data sets we developed in combination with information contained in other archival record collections. We will be discussing our findings with the International Council of Museum's Comité international pour les musées et collections d'instruments et de musique and others. The grantees are also in discussions regarding a possible contribution by U.C. Berkeley to a digital humanities project involving the Cité de la musique in connection with a freely accessible database for information on musical instruments held in public collections, known as "Musical Instrument Museums Online," <http://www.mimo-international.com/MIMO/>, which the Musée de la musique manages online (there are currently 74,668 instruments represented as of date of this report from twenty-seven European institutions, two African institutions, and one institution in China).

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

The full amount of the grant sum was spent on travel, lodging, and per diem expenses covering one week of collaborative research at the Musée de la musique in Paris

and two weeks of joint research at the Smithsonian Institution Archives Center, National Museum of American History, Washington, D.C. and on the stipend paid to our student scholar associated with her transcription of a portion of the historical materials and data entry.





<b>Sug Woo SHIN</b> Mathematics, UC Berkeley	<b>Stefano MORRA</b> Université de Montpellier
<b>On mod p and p-adic Langlands functorialities</b>	
<b>Start date:</b> July 2017	

### 1) Describe the work accomplished, in relation to the original project description.

Our France-Berkeley research project is currently being developed following two privileged axes:

A1) Functoriality of Serre weights and the Breuil-Mezard conjecture.

Despite a lot of research on Serre weights and the Breuil-Mezard conjecture for general linear groups, we only begin to grasp the problem for other groups (Gee-Herzig-Savitt 2017). The recent work of Koziol-Morra (“Serre weight conjecture for p-adic unitary groups of rank 2” available at <https://arxiv.org/pdf/1810.03827.pdf> which is part of our France-Berkeley initial proposal) successfully establish the weight part of Serre conjecture for unitary groups in 2 variables, by a combination of classical Langlands functoriality and the known results for the GL<sub>2</sub> situation. This required us to formulate versions of the Breuil-Mézard conjecture for unitary groups, opening the possibility to construct a moduli of mod p Galois representations and study it with most recent techniques of geometric representation theory as introduced by Breuil and Schraen.

Together with Sug Woo Shin and Florian Herzig we are currently exploring how much of the techniques of Koziol-Morra can be extended to higher rank groups, where the required results of functoriality are much harder to control due to the abundance of constituents in the L-packets involved in the change of groups.

We plan to further develop this axe during a stay of Koziol and Morra in Berkeley in April 2019, as well as a stay at the AIM in August 2019 (Herzig-Shin-Morra) and in Paris 13 in September 2019 (Herzig-Koziol-Morra)

A2) Scholze’s functor and parameters of Hecke eigen-classes associated to Galois representations

In his paper “On the cohomology of the Lubin–Tate tower” Scholze gives a geometric construction for a functor which should realize the mod p local Langlands correspondence. This has been a groundbreaking result, giving in the particular case of GL<sub>2</sub>Qp the celebrated Colmez “Montréal” functor, and it is expected to be compatible

with the Breuil-Colmez functor in much greater generality. Unfortunately, a large amount of basic properties of Scholze’s functor remained mysterious – the first of which is its interaction with Hecke torsion classes associated to Galois representations.

Recent results of Ludwig and Paskunas proved that, in the particular case of GL<sub>2</sub>Qp, the vanishing of Scholze’s functor for parabolic induction in higher degree cohomology has spectacular consequences toward a mod p Jacquet-Langlands correspondence.

The research we are accomplishing in this direction is within this framework and the precise goal we are currently working on is the following:

Given an outer form G of GL<sub>n</sub> which is split at p, we can \*globally\* produce smooth F<sub>p</sub>-representations of GL<sub>n</sub>Qp by considering its cohomology for a suitable equivariant local system. (We assume that G gives rise to compact Shimura varieties to be in the favorable geometric situations investigated by Caraiani-Scholze).

If m is an ideal in the Hecke algebra acting on the cohomology spaces above, and associated to a mod p Galois representation, the difference between the localization and the Hecke torsion part of the cohomology is extremely subtle and it is linked to how the local deformation parameters of the universal Galois deformation interact with the GL<sub>n</sub>Qp action.

Indeed Scholze’s functor on the “patched module” constructed by Shin and collaborators is expected to produce the universal Galois deformation, the latter expected to produce the universal GL<sub>n</sub>Qp deformation of the mod p automorphic representation corresponding to the Galois parameter via the hoped mod p local Langlands program.

Together with Herzig, Breuil and Schraen, we aim at proving that the Galois representation produced by the Hecke eigenclass via Scholze’s functor is isotypical for the original mod p Galois parameter we started from. To this goal, we are now reduced to the injectivity of a certain map between cohomology spaces, which already appears (in a simplified version) in Scholze’s work in the case of GL<sub>2</sub>. This injectivity problem is directly related to recent work of Breuil and Herzig on the ordinary part of the mod p local Langlands program, and the expected vanishing results of Scholze’s functor on the ordinary part of the cohomology.

We plan to have this work accomplished during our stay at the AIM in August 2019.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Sug Woo Shin (Associate Professor, UC Berkeley)

Stefano Morra (Maître de Conférence, Université de Montpellier, Professeur d'Université at Paris 8 from January 1st, 2019)

Christophe Breuil (Directeur de Recherche, CNRS, Université de Paris Sud)

Benjamin Schraen (Professeur d'Université, Université de Paris Sud)

External collaborators :

Florian Herzig (Associate Professor, University of Toronto)

Karol Koziol (Research Assistant, University of Alberta)

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

Koziol-Morra "Serre weight conjecture for  $p$ -adic unitary groups of rank 2" available at <https://arxiv.org/pdf/1810.03827.pdf>

Breuil- Herzig *Towards the finite slope part for  $GL_n$*

Breuil - Ding Higher  $\mathbb{F}$ -invariants for  $GL_3(\mathbb{Q}_p)$  and local-global compatibility

Koziol - Herzig - Vignéras *On the existence of admissible supersingular representations of  $p$ -adic reductive groups* -with an appendix of S-W. Shin

Koziol *The first pro- $p$ -Iwahori cohomology of mod- $p$  principal series for  $p$ -adic  $GL_n$*

To appear in Transactions of the AMS [Journal](#)

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

The projects above have both a concrete nature and a broad scope. This means we will need full and constant interactions between all the members of the projects, between France and Berkeley, since everyone has a unique

specialty to contribute. The concrete nature consists in the precise strategies we have to achieve them: each discussion between us will produce effective progress in producing the final publications.

Extended visits in France and UC Berkeley by the members are absolutely crucial to guarantee the continuation and success of our proposal, and the France-Berkeley fund is essential resource we are relying on to achieve our mathematical breakthrough.

The time which is usually needed for achieving mathematical project -especially when ambitious as those above- ranges from 2 to 3 years. For this reason the collaboration that started in Oct. 2017 will be just the very beginning of a series of exchanges and collaborative projects between us that will keep us occupied for at least 4-5 years, and a promising range of further perspectives yet to be explored.

In particular we have a spectacularly fast growing list of realistic and ambitious problems as well as concrete plans to attack them. We expect to finalize the A2) of our project in August 2019, when all members of the team will be in the same place, and pass subsequently to the write up of our paper in the coming months. (Note that a research paper in mathematics is typically long, ranging from 20 to 100+ pages. So it takes a long time to finish each paper.) The solution of each problem we proposed above merits a decent publication, and we expect to produce two to four papers as the outcome of our project within a few years, and certainly more in a later time considering the wide horizon of perspective our discovery will lead to.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

Shin spent \$3500 for his trip to France in May 2018. We anticipate that Morra and co-PI's Herzig and Schraen will visit Berkeley some time in Spring 2019. The expected budget is \$5000. All PI's and co-PI's plan to meet again at American Institute of Mathematics in San Jose and also at UC Berkeley in August 2018; we plan to spend the rest of the grant then.

As we alluded above, we are just at the very beginning of a series collaborative projects between us that will keep us occupied for at least 4-5 years. Moreover a research paper in mathematics is typically long, ranging from 20 to 100+ pages and requires a tremendous care in

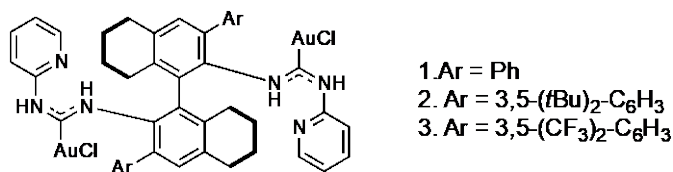
writing and checking that all minimal details are set up correctly. For this reason, and for the richness and the wide scope of the project A1), A2) we are currently developing, we expect to produce two to four papers as an outcome, which will certainly require a few years to be fully published.

For these reasons we aim at applying to other sources of funding for the coming years, as the Banff “research stay”, or similar research funding as Oberwolfach, the Fondation de Sciences Mathématique de Paris, the Toronto-France fund, etc... We would also need to extend the availability of our FBF to the whole 2019, and possibly to renew it for 2020.

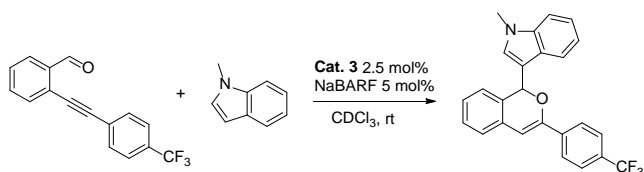
<b>F. Dean TOSTE</b> Chemistry, UC Berkeley	<b>Véronique MICHELET</b> Institut de Chimie de Nice
<b>Water-soluble gold complexes in molecular chemistry: towards green chemistry and sustainable development</b>	
<b>Start date:</b> December 2017	

**1) Describe the work accomplished, in relation to the original project description.**

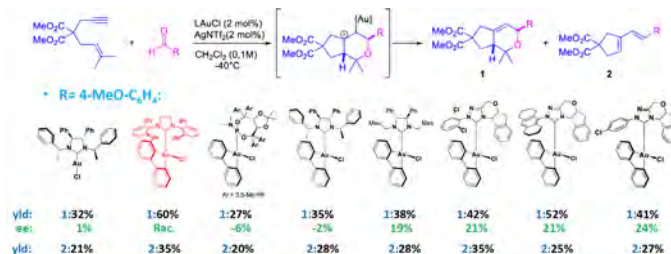
As proposed, the UC Berkeley team has prepared several chiral carbene ligands and gold catalysts (see below). These were sent to the Michelet lab in Nice to explore in as catalysts for their gold catalyzed reactions:



The Nice team have shown that these catalysts provide promising results in a number of reactions. An example is given below where the product was obtained 26% ee.



On the basis of these preliminary results, additional catalysts were prepared in Berkeley and tested by the Nice team. During these screens, the teams became interested in the viability of the Berkeley team's recently discovered gold(III) complexes as catalysts for the types of transformations being developed by the Nice team. To this end, Mr. Aurelien Dupeux from Nice, visited the UC Berkeley lab. Here he worked with Mr. Patrick Bohan to prepare gold(III) complexes and test them in his reactions. An example of one of these experiments is shown below. These tests showed that the Berkeley gold(III) catalysts provided increased selectivity for the desired product (1) and also provided the first examples of enantioselective synthesis of 1.



Efforts are ongoing to improve these catalysts and evaluate them in additional gold-catalyzed transformations.

**2) Give the names and ranks (ex. doctoral student, associate professor, etc.) of all participants in the project.**

Prof. Véronique Michelet (Professor, University of Nice Sophia-Antipolis)

Prof. F. Dean Toste (Professor, University of California, Berkeley)

Mr. Aurelien Dupeux (doctoral student, University of Nice Sophia-Antipolis)

Mr. Patrick Bohan (doctoral student, University of California, Berkeley)

Ms. Caroline Rouget-Virbel (doctoral student, University of California, Berkeley)

**3) List all publications resulting from this project. Include journal titles and issues/dates.**

None to date.

**4) Comment on the collaborative nature of this project, highlighting aspects that have fostered continuing relationships between French institutions and UC campuses. Will future collaboration occur as a result of this project?**

The project was highly collaborative. Catalysts were developed at UC Berkeley and tested in Nice. The success of the Berkeley catalysts led a student from Nice to spend a month in Berkeley to learn how to prepare the Berkeley catalysts. This transfer of technology assures that the collaboration between the teams will continue beyond the end of this grant. Additionally, during the funding period Prof. Michelet from Nice visited UC Berkeley to present her research work and discussed potential future collaborations with Prof. Toste and his team. As a result, a UC Berkeley student will visit Nice this coming summer to continue discussion with the Nice team on the use of

water-soluble ligands in gold-based organometallic chemistry and catalysis.

**5) Give a final accounting of how the France-Berkeley Fund award was spent. Do you envision soliciting additional outside funding for this or related projects in the future, and if yes, from where?**

Below is a general outline of how the funds were spent.

Chemicals and Supplies: \$2000 (18%)  
Instrumentation Recharges (e.g. NMR): \$500 (4%)  
Nice graduate student (Aurelien Dupeux) visiting UCB:  
\$3000 (27%)  
Aurlien Dupeux visa and VSPS: \$1500 (13%)  
Prof. Michelet visiting UCB charges: \$2000 (18%)  
UCB student (Caroline Rouget-Virbel) visiting Nice:  
\$2000 (18%)

At this stage, the project is ongoing. Catalysts and ligands continue to be made at UC Berkeley and shipped to Mr. Aurlien Dupeux who continue investigating their application in the chemistry he initiated during his visit to UC Berkeley. If the results are positive, funding will be sought to continue this work.



# GIVE TO FBF

Join us in supporting the next 25 years of innovative research and collaboration

As the France-Berkeley Fund celebrates 25 years of advancing interdisciplinary inquiry and international exchange, there is no better time to invest in the future of our program. We invite you to mark this milestone with us by making a gift to our grant fund.

Gifts to the FBF go directly to help sustain cutting-edge collaborative projects that bring together students, researchers, and junior scholars from UC Berkeley and institutions throughout France.

To learn more about giving opportunities, visit [fbf.berkeley.edu/give-fbf](http://fbf.berkeley.edu/give-fbf)

**This is a wonderful program for starting new collaborations, which fills a real need in the funding landscape.**

— 2016 grantees BRENT MISHLER (Integrative Biology, UC Berkeley) and WILFRIED THUILLER (Université Grenoble Alpes)

**The funds provided by the FBF have permitted a fruitful dialogue between American and European foreign language educators, and shown how beneficial such a confrontation is for cross-cultural research.**

— 2003 grantees CLAIRE KRAMSCH (German, UC Berkeley) and GENEVIÈVE ZARATE (Institut National des Langues et Civilisations Orientales, Paris)

**The collaboration was a genuine turning point in my career, internationalizing my outlook and understanding of my field.**

— DIANE AMANN (Professor of Law), FBF '03

**The students involved in the project benefited greatly from meeting leaders in the field and gaining intellectual and practical skills required to pursue their research.**

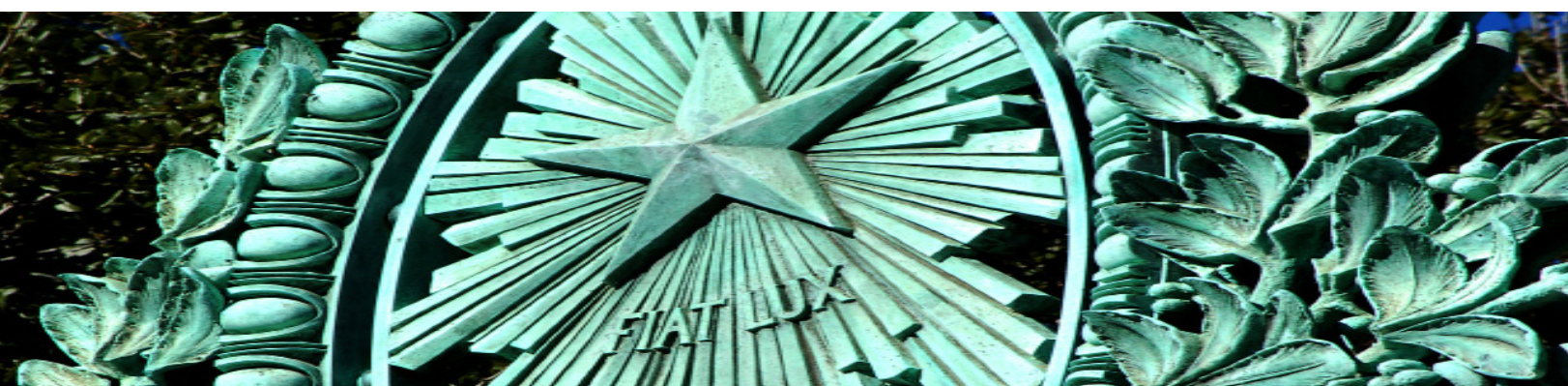
— 2013 grantees LANCE KRIEGSFELD (Psychology, UC Berkeley) and MATTHIEU KELLER (Université Val de Loire-Tours)

**Keep supporting multi-lateral research, it improves science and opens minds.**

— 2014 grantees MARY FIRESTONE (Environmental Science, UC Berkeley) and ROMAIN BARNARD (INRA Dijon)

**The opportunity to work closely on this project has enabled us to cast our inquiry more widely than we would have dared alone.**

— 2014 grantees RONALD HENDEL (Near Eastern Studies, UC Berkeley) and JAN JOOSTEN (Université de Strasbourg)



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