

I. Office Furniture and Task Lighting



Steelcase "Leap" task chair



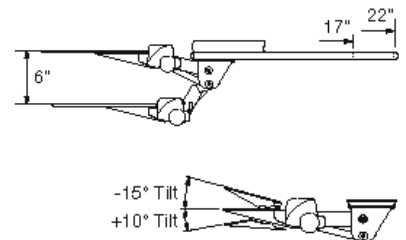
Steelcase "Answer" panel system workstation with adjustable height worksurfaces.



Luxo "Air LED" task light



Workrite 28" Split-Pad Standard keyboard and mouse platform with "Pinnacle 2" mounting arm



Adjustable height monitor

2. Lab Furniture and Task Lighting



ISEC/Jamestown Metal Products adjustable height mobile laboratory workstations



Lunera 6100 and 6200 LED task lights mounted to shelves just above work surfaces; manual "on" with vacancy sensor "off"



Mobile storage and file cabinets

**3. UC Berkeley Ergonomics
Standards for Laboratories****Capital Projects Home Page****Special Requirements 6A****Laboratory Ergonomics Requirements***Typical write-up stations/tech desks:*

- Provide adjustable height top with a range of 22" – 32". If top must be fixed, set height at 28-1/2". Note that height of Steelcase 9000 series desk is 29-3/4". The desk should be adjusted down to 28-3/4", which will then be acceptable in this application.
- Provide knee space with minimum 30"-wide clearance. Avoid pencil drawers or aprons at knee spaces, as these interfere with legroom.
- Use of removable, mobile under counter storage units promotes flexibility to adjust number and location of knee spaces as needed. If mobile units are relocated, ensure aisle clearances and accessibility are maintained.
- Depth of work surface should be 30" if a CRT monitor and keyboard will be placed on the work surface. A depth of 24" minimum can be used if a laptop or flat panel monitor will be used.
- If feasible, avoid epoxy resin tops at write-up desks, as it is difficult to install keyboard trays to the underside of epoxy without special drills.

Sitting-height lab benches:

- Provide adjustable height top with a range of 22" – 32". If top must be fixed, set height at 28-1/2".
- Provide knee space with minimum 30"-wide clearance. Avoid pencil drawers or aprons at knee spaces, as these interfere with legroom.
- Use of removable, mobile under counter storage units promotes flexibility to adjust number and location of knee spaces as needed. If mobile units are relocated, ensure aisle clearances and accessibility are maintained.
- Depth of work surface should be 30" if a CRT monitor and keyboard will be placed on the work surface, or as other current or future lab equipment requires. A depth of 24" minimum can be used if a laptop or flat panel monitor will be used, and for microscopy.

Standing-height lab benches:

- At typical 36" high counters, provide no less than one knee space per each side of an island, with minimum 30"-wide clearance. Avoid pencil drawers or aprons at knee spaces, as these interfere with legroom.
- Depth of work surface should be 30" if a CRT monitor and keyboard will be placed on the

work surface, or as other current or future lab equipment requires. A depth of 24" minimum can be used if a laptop or flat panel monitor will be used, and for microscopy.

- Use of removable, mobile under counter storage units promotes flexibility to adjust number and location of knee spaces as needed. If mobile units are relocated, ensure aisle clearances and accessibility are maintained.

Lab top edges:

- Round or bevel the front edges of epoxy resin or similar tops to eliminate sharp edges.
- Avoid placing lips on countertops. The lips create contact stress to users and interfere with equipment placement.

ADA compliance:

- 36"-wide knee space is required at ADA work areas. Standing height counter-tops will generally be adjustable in the range of 28" – 34" or fixed at 34", or as established by authority having jurisdiction. See code and authority having jurisdiction for quantity, location, dimensional and other requirements of ADA-compliant lab benches. Requirements will vary depending on whether the labs are for teaching or research, and as a function of the specific program.

Lab furnishings:

See "[Laboratory Ergonomics Information Packet](#)", [University Health Services](#), for examples of adjustable sit/stand laboratory stools with a height range of 22" – 32", adjustable production foot rests and other products. (<http://www.uhs.berkeley.edu/facstaff/ergonomics/lab/index.shtml>)

[Return to Special Requirements](#)

4. UHS Laboratory Ergonomics Information


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Laboratory Ergonomics

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Appendix

- [Ergonomic Pipettes](#)
- [Laboratory Ergonomics Equipment & Solutions](#)

Please note: Product referrals in this section are for informational purposes only. Their inclusion in this website does not constitute endorsement by the University of California.

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Ergonomics in Research Labs

Whether you plan to work in a research lab for one semester or throughout your career, there are ways to protect yourself from ergonomic hazards common in laboratory settings. *Don't wait until your body tells you it's too late!* The guidelines and ideas on this website are fairly simple to implement, and by incorporating them into your daily life, you can help avoid the aches, pains and sometimes injuries that poor ergonomics can cause.

Laboratory researchers are at risk for developing cumulative trauma injuries because of the repetitive nature of pipetting, use of small hand held tools, opening and closing vial caps, prolonged awkward postures at a microscope, laboratory hood or biological safety cabinet, and a variety of other laboratory tasks. The cumulative concept is based on the theory that each repetition of an activity produces some trauma or wear and tear on the tissues and joints of the body. These injuries occur gradually over time.

Common ergonomic risk factors include:

- **Repetition**—performing the same motion over and over again.
- **Awkward Body Postures**—sustained holding of a bent position of the neck, back, hands/wrists, arms raised above shoulder level or arms extended out in front of the body.
- **Force**—physical exertion or pressure applied to any part of the body while working, such as lifting, pushing, pulling, gripping or pinching equipment or tools.
- **Contact Stress**—pressure on soft tissues of the body, such as the soft part of the palm, wrist or the sides of fingers by tools and sharp edges.
- **Extreme Temperatures**—cold air temperatures (55°F and lower) may cause loss of dexterity proportional to exposure time.

Common symptoms of cumulative trauma injuries include:

- **Pain**
- **Numbness and tingling**
- **Stiffness or cramping**
- **Inability to hold objects or loss of grip strength**

Symptoms that go away overnight are usually a sign of fatigue. Symptoms that are continuous and don't go away overnight may indicate a serious problem. Those experiencing such symptoms should seek medical attention. Cumulative trauma injuries are easier to treat in their early stages. Ignoring symptoms can lead to chronic or serious injury.

It is important to plan experiments in such a way to avoid prolonged pipetting, microscope, laboratory hood, and biological safety cabinet work. The following pages offer prevention tips, ideas for tool modifying your tools, product information and stretches to try to help reduce ergonomic risks.

Next: [Pipetting](#)
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Laboratory Ergonomics: Pipetting

Most pipetting tasks are highly repetitive and demand hours of continuous effort. It is not uncommon to repeat aspirating and dispensing motions 1,000 times a day. The ejection motion requires the most force. The following suggestions may eliminate ergonomic risk factors while pipetting.

To reduce repetition:

- Attach a [microtube accessories](#) to your vortexer to eliminate hand mixing with your pipettor.
- Use pipettes where the thumb dispenses and the index finger aspirates.
- Alternate using your right and left hand to pipette when appropriate.
- Use [ergonomic pipettes](#). These pipettes reduce repetition and excessive thumb force. Some manufacturers offer trade-in policies to help reduce the cost of purchasing new pipettes.
- Set your pipetting experiments up to allow for [stretch/rest breaks](#). Mild stretches give your muscles and tendons a rest.
- Rotate pipetting activities with other laboratory tasks.

To reduce awkward postures:

- Keep head, shoulders and spine aligned in a balanced position.
- Post protocols straight ahead at eye level to prevent bending or twisting.
- Select pipettes that are lightweight and fit comfortably in your hand.
- Work with arms close to the body to reduce shoulder strain. To help reduce reach:
 - Use shorter pipettes.
 - Place low waste receptacles for used tips no higher than the top of the tubes being filled.
 - Use short solution containers.
 - Position frequently used items close to you.
 - Remove false fronts under the worksurface and any supplies underneath to get closer to the work at laboratory hoods.
 - Open or remove cabinet doors and pencil drawers at lab benches.
- Use arm supports if you are performing a task that requires reaching or elevating your arm without support. Adjustable arm supports help prevent fatigue in the neck, shoulders and arms.
- Work with wrists in a straight, neutral position.
- Keep your work at waist level. Adjust your workstation or chair to help prevent working with your arms in an elevated position.
- Take breaks every 20-30 minutes and change your posture and activity frequently.

To reduce excess force:

- Select pipettes that are lightweight and fit comfortably in your hand.
- Use de-capping devices to open the micro-tubes.
- Clean pipettes on a regular basis.
- Use minimal force when applying pipette tips.
- Use thin-walled pipette tips that fit correctly and are easier to eject.
- Use [electronic or multi-channel pipettes](#) for repetitive tasks. These pipettes reduce repetition and excessive thumb force.
- Because the thumb is stronger, use pipettes where the thumb dispenses and the index finger aspirates.



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Laboratory Ergonomics: Microscope Work

Microscope work usually involves prolonged sitting, high visual demands and repetitive adjustment of microscope controls. Common symptoms from microscope use may include eyestrain, sore hands from maneuvering the controls and sore necks and shoulders from awkward sitting postures. The following suggestions may eliminate ergonomic risk factors at the microscope.

To reduce repetition:

- Limit microscope use to no more than 5 hours per day.
- Take frequent [stretch breaks](#) and rotate tasks as often as possible.
- Alternate using the right and left hands when making adjustments on the microscope.

To reduce awkward postures:

Avoid jutting your chin forward or bending your neck down when using the microscope. Adjust the height of the chair, workbench or microscope instead. Adjust your chair height so that your thighs are horizontal or slanted slightly down, your back is supported and your feet are flat on floor. Use a footrest if your feet do not touch the floor. Leaning or resting on the foot rings can cut off circulation in the back of your thighs.

- Raise, incline and move microscopes as close as possible to keep your head upright. Use sturdy items to raise the microscope, if needed, such as stackable risers or an adjustable monitor riser. An empty 2-inch binder can be used to angle the microscope forward. Secure the microscope to the binder with Q-Brace straps.
- Use [microscope adapters](#) to promote balanced head, neck, shoulder and arm postures.
- Use [forearm rests](#) to support your forearms while using adjustment knobs or hand tools to work with specimens under the microscope. This helps relieve fatigue and strain.
- Have an eye exam if you are experiencing any visual difficulty. Wear glasses if needed.
- Use television systems to eliminate the use of binocular eyepieces when appropriate.
- Make sure there is adequate room under the work surface to pull the chair in as close as possible to the work task.
- Open or [remove cabinet doors](#) to place your feet inside to help get closer to your work.
- Work with elbows close to the body and have them bent as close to a 90-degree angle as possible
- Work with wrists in a straight, neutral position.
- Tilt storage bins toward you to reduce using awkward wrist postures while reaching for the supplies.

To reduce force

- Enlarge your small hand [tools](#) such as forceps and dissecting needles by placing [cylindrical foam](#) around them. This helps reduce the pinch force.
- Use locking mechanisms or other [adaptive aides](#) to reduce sustained force which using your forceps.
- Watch the way you hold your small tools. Make simple [tool modifications](#) if you are not keeping your wrist straight.

To reduce contact stress:

- Avoid resting forearms on sharp edges. Apply desk edge [padding](#) to the front edge of the desk.
- Use [forearm supports](#) or place a lab notebook along the sides of the microscope base to avoid resting on the edge of the base.



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- Use [adjustable chairs](#) with a [footrest](#). Leaning or resting on the foot rings can cut off circulation in the back of your thighs.

To reduce eyestrain:

- Blink often, closing the eyelids completely, to keep your eyes moist.
- Focus on a distant object - at least 20 feet away – every 15 minutes or so. This will give the muscles in your eyes a rest.
- Cup your hands and place them gently over your closed eyes for a minute to rest them from the light.
- Don't touch or rub your eyes.

Next: [Unsafe and Safer Postures](#)

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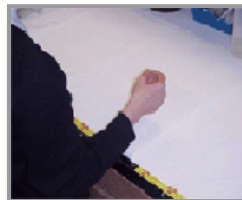
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Laboratory Ergonomics: Recommended Postures in the Lab

Examples of unsafe and safer postures

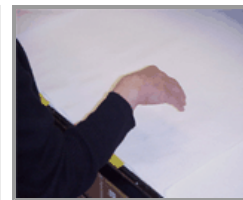
Research in a laboratory setting may require sitting, standing, using hand tools, pipettes, microscopes and working at laboratory hoods or biological safety cabinets. Some postures are more stressful than others and should be avoided. The photos in this section help illustrate some recommended as well as stressful postures, beginning with the wrists and elbows.



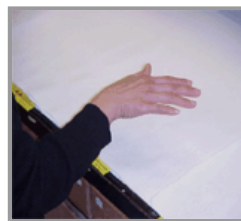
Recommended: Use the neutral "hand shake" position with wrist straight and elbow next to side.



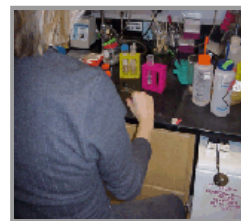
Unsafe: Avoid positions with bent wrists. Photo above shows wrist extension -- when the hand is bent back at the wrist.



Unsafe: Again, the wrist is bent. This photo demonstrates wrist flexion-- when the hand is bent forward at the wrist.



Unsafe: Ulnar Deviation (hand bent outward at wrist--toward little finger)



Unsafe: Radial Deviation (hand bent inward at wrist--toward thumb)

Avoid holding or repetitive motion with bent wrist:

Avoid sustained holding or repetitive motion with rotated forearm:



Pronation: Forearm rotated so palm faces downward



Supination: Forearm rotated so palm faces upward



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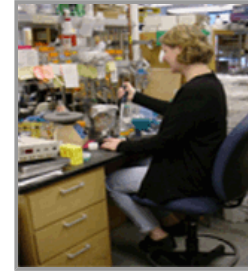
Wrists, elbows and getting close to your work

Position your elbows close to your body to reduce stress on your neck and shoulders. Remove cabinet doors and pencil drawers to get closer to the work.

Recommended: To the right, researcher is close to work; elbows positioned close to body.

Unsafe: Below, she is far away from work; her elbows are extended from body.

Recommended: Forearm supports
Below, forearm support encourages neutral wrist postures.



Unsafe:
Below, stressful wrist postures (wrist in ulnar deviation; elbows at 30°)



More ways to get close to your work

Shorter workers can reduce awkward arm postures by lowering the workstation. At a built-in counter, lower the surface by pulling out a drawer and placing a sturdy platform between the drawer edge and the cabinet.



Recommended:
Above, good workstation height.



Unsafe: Above, right elbow is positioned too high.

The built-in cabinets underneath counters and the false fronts and supplies stored under laboratory hoods and biological safety cabinets prevent getting close to the work surface while sitting. This encourages pipetting with the arms too far away from the body.



Position closer to the counter by opening or removing the cabinet doors, as above.



Position closer to the laboratory hood by removing the cabinet doors, as above.

false fronts and supplies stored underneath.

Reducing Contact Stress



Unsafe: Above, contact stress from edge of desk (resting arm on hard, sharp surface)



Recommended: Use a forearm support to eliminate contact stress.



Recommended:
Desk-edge padding reduces contact stress.

Next: [Modifying Your Tools](#)
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Laboratory Ergonomics: Micro-manipulation Tools and Modification Techniques

Certain laboratory tasks require using tools that promote pinch grips and awkward wrist postures.

A pinch grip requires the tool to be grasped between the index finger and the thumb for precise manipulations. When a pinch grip is used intensively and for a long duration, such as when dissecting fruit flies, worms and plant specimens, fatigue may occur in the hand and forearm muscles. Over a period of time, this may contribute to developing a repetitive strain injury.

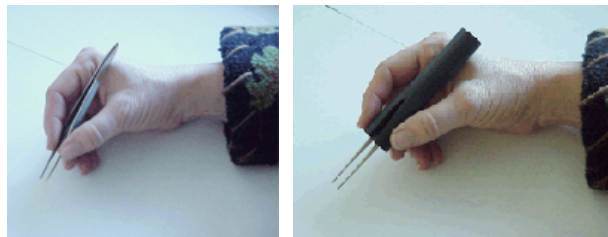
Some hand tools are designed to reduce pinch grip force and awkward postures. Older tools may be able to be modified.

The basic principle of a modification is to:

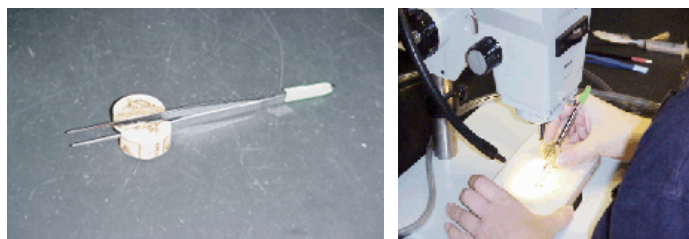
- Build up the part of the tool that your hand holds so it will fit your hand better and reduce pinch force or
- Change the angle of the handle so your hand holds the tool with a straight wrist.
- Use non-slip materials to reduce the force needed to hold the tool in position.



Enlarging Forceps



To modify the forceps, purchase rectangular cylindrical [foam](#). Partially cut the foam along both sides so the forceps can be placed inside.



Another way to modify the forceps is to cut a wine cork in half and then take one of the cut sections and cut it in half the long way. Glue the two halves to the outside of the forceps to enlarge your grip.

Add a Handle

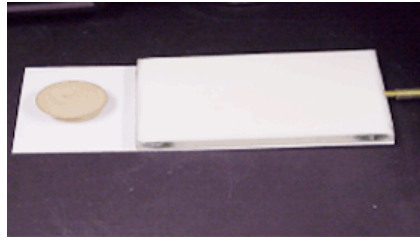
Enlarge a dissecting needle tool to reduce pinch grip force
Purchase round cylindrical foam. Cut the foam along one side and slide it over the syringe or glass tube to help enlarge the grip.



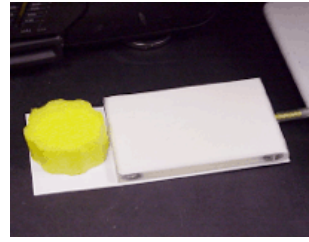
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with handle added



with handle added

Adding a handle to maneuver a rectangular object, such as a CO2 pad, can reduce using awkward and forceful hand postures.

To make a handle modification, attach the rectangular object (CO2 pad) to a 1/8-inch thick piece of plastic with Velcro (place the Velcro underneath the CO2 pad so it can be connected to the top of the plastic). Plastic can be custom-cut at Tap Plastics in El Cerrito (525-3508).

When measuring for the plastic, allow an additional 3-inches in length to attach the handle. A handle such as a knob, foam, cable clamp or T pipe molding can be attached to the outer 3-inches of the plastic piece with rubber cement. Make sure the handle will encourage using a neutral hand posture with a minimal amount of gripping force.



Unsafe

The photo above shows how the fingers and thumb of the left hand are using an awkward and forceful posture to maneuver the CO2 pad in a fly lab.

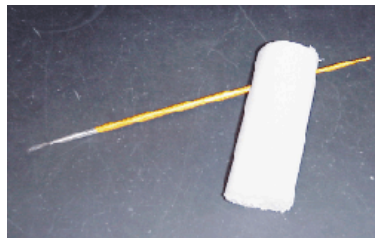


Recommended

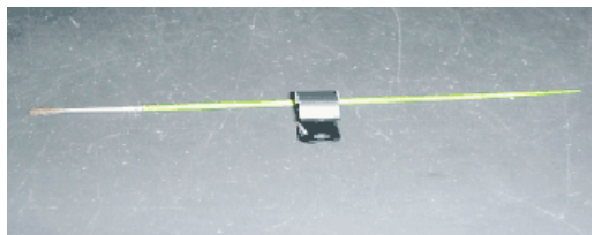
Here, the left hand is using a less stressful posture because the fingers and thumb are holding a knob that has been attached to a piece of plastic.

Alternative Handles

Creating Alternative Handles for Straight Tools Can Reduce Awkward Wrist Postures



Above: Insert the end of a paintbrush or feather into [Plastizote Tubing](#) to create an alternative way to grip and angle the tool.





Or, tape a ¾ or 1-inch plastic cable clamp, depending on your finger size, onto the middle of the paintbrush. Insert your index finger inside of the cable clamp so you can more easily maneuver the brush. Plastic cable clamps can be purchased at most hardware stores.

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- **Laboratory Ergonomics Workshops:** Principal Investigators, Department Safety Coordinators, or Department Safety Committees can schedule a laboratory ergonomics workshop by calling Ergonomics@Work at (510) 643-2540.
- **Health and Safety Issues:** Contact your Department Safety Coordinator, Department Safety Committee, or call Environment, Health, and Safety at (510) 642-3073.
- **Medical Care**
 - For faculty or staff with work-related medical problems, call the Occupational Health Clinic for an appointment at (510) 642-6891.
 - For students, call University Health Services for an appointment at (510) 642-2000.

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- Health*Matters Walking Group, thru Dec 31
- Blood Drives at UC Berkeley, May 2
- Darwin, Diet, Disease, and Dollars, May 3


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TAKE A STRETCH BREAK!

Take a 5-minute break away from your workstation every 1/2 hour!

- Get up from your workstation and move around
- Rotate your job tasks to avoid constant repetitive work
- Try a few stretches*

Stretches for your...

- neck
- shoulder/upper back
- upper arms
- wrists/forearms
- hands
- lower back



Remember these basics while stretching:

- Pain is not gain! Stretch until you feel a mild tension that relaxes as you hold the stretch. If a stretch hurts, ease up on the amount of stretch. *Stop* doing the stretch if you can not do it without pain.
- Don't bounce! Hold each stretch 5 to 30 seconds.
- Breathe slowly and deeply while you stretch.

*Consult your health care provider before beginning a stretching program if you have had any recent surgery, muscle or joint problems.

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ERGONOMIC PIPETTES

Ergonomic pipettes differ from traditional manual pipettes in that the design offers a way to reduce the force required to perform the pipetting task. For example,

- a lightweight pipette makes it easier to hold;
- a finger hook lets you rest your hand and use a lighter grip;
- a magnetic latch holds the plunger down reducing the need to exert continued thumb pressure;
- a multi-channel reduces repetition and
- an electronic pipette eliminates most of the pipetting forces altogether.

In addition to these features, there are new designs which drastically reduce dispensing and ejection tip forces.

There are a variety of [ergonomic pipettes](#) available. Sales representatives for the different manufacturers can provide samples for you to try. This can help you decide if an ergonomic pipette is applicable to your needs. Contact your Principal Investigator to find out what your laboratory's policy is for purchasing and using different pipettes. Keep in mind that purchasing a different pipette will usually require purchasing different tips.

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LABORATORY ERGONOMIC SOLUTIONS

1. Alternative pipettes

- Rainin -- 1-800-472-4646 Website at <http://www.rainin.com>.
- Biohit --1-732-922-4900. Website at <http://www.biohit.com>.
- Thermo Finnpipette – 1-800-522-7663. Website at <http://www.thermo.com>
- Eppendorf – Website at <http://www.eppendorf.com>
- VistaLab Technologies (Ovation) – 1-888-652-6520. Website at <http://www.vistalab.com>

2. Micro-tube accessories

- De-capping devices make it easier to open the tops of micro-tubes.
- Vortex mixing accessories (foam inserts) can be used to reduce repetition.

3. Arm Supports and Padding

- Soft vinyl foam can be positioned directly on the front edge of the work surface to soften the edge.
- Angled adjustable forearm supports help when working at the microscope.
- Placing padding under your forearms and elbows reduces contact stress.

4. Microscope Positioners and Adapters

- Changing the height of the microscope and using various adapters can reduce using awkward postures.

5. Micro-manipulation Tools and Modification Techniques

- Try ergonomic tools to reduce using pinch grips.
- Use padding to soften contact stress.
- Modify your tools to reduce awkward postures.

6. Other Laboratory Equipment

- Adjustable footrests
- Anti-fatigue mats
- Turntables

7. Height adjustable chair

- Steelcase Criterion High Task Stool

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Ergonomics Checklist for Designers

Ergonomics@Work’s Health and Safety Guidelines for Computer Users are based on the ANSI/HFES 100-2007 Human Factors Engineering of Computer Workstations standard. The tables, keyboard trays and chairs on the Ergonomics Program’s pre-approved product list meet the minimum requirements under this standard. When specifying computer tables, keyboard trays and chairs not on this list, the following guidelines must be met and cut sheets showing all of the applicable dimensions included with your specifications:

Item	Guidance	Checked
Seated Computer Use	Front edge of computer work surface is 27.6 inches or greater	<input type="checkbox"/>
	Depth of computer work surface is 24 inches or greater	<input type="checkbox"/>
	User or maintenance adjustable for single users – if top must be fixed, set height at 28.5 inches with 27 inches of clearance from floor to bottom of surface	<input type="checkbox"/>
	User adjustable for multiple users	<input type="checkbox"/>
	If a separate adjustable keyboard support is used it must have space specifically designed for using a mouse, trackball or tablet	<input type="checkbox"/>
	Input device surface is adjustable in height from at least 22-28.3 inches as measured from the floor to the top of the surface	<input type="checkbox"/>
	Enough clear space should be allowed under the surface to enable the legs and feet to be positioned in multiple postures	<input type="checkbox"/>
Standing Only Computer Use	Front edge of computer work surface is 27.6 inches or greater	<input type="checkbox"/>
	Depth of computer work surface is 24 inches or greater	<input type="checkbox"/>
	User or maintenance adjustable for single users	<input type="checkbox"/>
	User adjustable for multiple users	<input type="checkbox"/>
	If a separate adjustable keyboard support is used it must have space specifically designed for using a mouse, trackball or tablet	
	Input device surface is height adjustable from 30.7 to 46.5 inches; if tilt adjustable some portion between 20 and -45°, including the range 0 to -15°	<input type="checkbox"/>
Chair	Provide chairs from the Campus Ergonomics program pre-approved product list which offer a wide range of adjustability	<input type="checkbox"/>
	If specifying task chairs not on this list, the chair vendor must use the attached Checklist for Purchasing Task Chairs and illustrate how the chair meets all the minimum requirements	<input type="checkbox"/>
Reception Counters	Reception counters have different seated and standing computer requirements due to the interaction with the client. Use the attached Checklist for Reception Counters when designing these areas.	<input type="checkbox"/>

6. Ergonomics Checklist for Computer Workstations

Ergonomics Checklist for Department Computer Workstation Evaluators

Ergonomics@Work's Health and Safety Guidelines for Computer Users are based on the ANSI/HFES 100-2007 Human Factors Engineering of Computer Workstations standard. The Department Computer Workstation Evaluators use the attached Computer Workstation Assessment Form to evaluate the individual computer workstations. The guidance below is addressed through the assessment form.

Item	Guidance	Checked
Display adjustability	- The display should be centered directly in front of the body.	<input type="checkbox"/>
	The top of the display screen should be placed no higher than the eyes.	<input type="checkbox"/>
	The display screen should be placed 18 to 36 inches from the eyes.	<input type="checkbox"/>
Display reduce glare	- The display should be positioned such that light sources will not create glare.	<input type="checkbox"/>
Peripherals	Paper documents should be placed on a document holder immediately to the left, right or below the display.	<input type="checkbox"/>
	The keyboard should be positioned so the home row (row with the F and J keys) is no higher than the elbow.	<input type="checkbox"/>
	The user must have the ability to adjust the keyboard angle and set the slope of the keys flat, if so desired.	<input type="checkbox"/>
	There must be enough room for the mouse or pointing device to be used adjacent to the keyboard (left, right or in front). Is a separate adjustable keyboard support is used it must have space to specifically designed for using a mouse or pointing device; preferably the mousepad should have the capability to be positioned flat if the keyboard is tilted. The arm used to control the pointing device supported, either on the work surface or arm rest of the chair.	<input type="checkbox"/>
	Ergonomically correct keyboards, pointing devices, phones and other supporting peripherals should be purchased when possible.	<input type="checkbox"/>
Surface	There must be enough work surface to properly support the computer and peripherals. Provide a surface with minimum dimensions of 28 inches wide by 24 inches deep.	<input type="checkbox"/>
	Enough space should be allowed under the surface to enable the legs and feet to be positioned in multiple postures.	<input type="checkbox"/>
	Furnishings in multi-occupant workstations that allow the user to control surface and support heights, with surface height initially at properly seated elbow height. If workstations are single occupant it is acceptable for facilities management to adjust the height of surfaces.	<input type="checkbox"/>
Chair	Provide a range of chair types or chair features that optimize employee fit and task requirements.	<input type="checkbox"/>
	Chairs must have a wide range of adjustability.	<input type="checkbox"/>

Checklist for Purchasing Task Chairs at UC

Use this checklist to help determine if a vendor's product meets UC ergonomics guidelines.

INSTRUCTIONS: Each box listed under the Basic, Seat, Backrest, and Armrest feature sections must be checked. Chairs that meet preferred features are recommended over chairs which meet minimum features. If any of the boxes are not checked, the product is not recommended for purchase. Chairs that also meet recommendations listed under the Value-added Features section are recommended over chairs which do not meet these recommendations.

Note: These guidelines apply to approximately 90% of the population. Petite, tall or large-framed individuals and people with specific ergonomics needs may require equipment with size or range adjustments that are outside the parameters provided below. Contact your local UC Ergonomic Program Coordinator for assistance with applying these requirements and for more information.

Throughout this document there are numbers in parentheses. These numbers correspond to the references at the end of the document.

MINIMUM REQUIREMENTS*:

Basic Features:

- Chair seat swivels easily on a five-leg pedestal base with casters (2, pg. 13)
- Casters are available for different floor surfaces such as carpet, hardwood, and linoleum (2, pg. 13)
- Adjustment controls - easy to adjust from the sitting position and clearly marked to indicate function (1, pg. 14)
- No sharp or hard edges anywhere on the chair or controls (1, pg. 14)
- Weight capacity of chair is:
 - Preferred: At least 275 pounds (current practice for standard chairs)
 - Minimum: At least 250 pounds (manufacturing industry standard; 5)
- Five-year minimum warranty
- Instructions on how to use chair are provided to end user

Seat Features:

- Seat height – adjustable at least 4.5 inches within the range of 15 - 22 inches from the floor (1, pg. 87)
- Seat depth – **one of the following must be checked:**
 - Preferred: Adjustable seat depth - provide up to 3 inches of forward/backward seat pan movement, range must include 16.9" seat depth (1, pg. 87)
 - Minimum: If non-adjustable, seat should be no greater than 16.9" deep (1, pg. 87)
- Seat pan angle – **one of the following must be checked:**
 - Preferred range is at least 4 degrees of user-controlled adjustability, from leaning forwards to leaning backwards 3 degrees (1, pg. 87)
 - Minimum – If seat pan angle does not adjust, seat is designed with a slight backward or forward angle
- Seat pan width – minimum of 17.7" wide (1, pg. 87)
- Front edge of seat is rounded (1, pg. 87)

Backrest Features:

- Backrest height – top of backrest is at least 17.7 inches above the seat (1, pg. 88)
- Backrest height adjustability – **one of the following must be checked:**
 - Preferred: entire backrest and/or lumbar support adjustable from 5.9-9.8 inches above the seat (1, pg. 88)
 - Minimum: entire backrest and/or lumbar support is height-adjustable within the range of 5.9-9.8 inches above seat (1, pg. 88)
- Backrest width – at least 14.2 inches (1, pg. 88)
- Backrest shape – **one of the following must be checked:**
 - Preferred: backrest should curve outward towards seated user (6, pg. 83)
 - Minimum: backrest is curved at the lower portion to support the lumbar area (6, pg. 83)
- Backrest angle – **one of the following must be checked:**
 - Preferred: backrest angle has an adjustment of 15 degrees or more within the range of upright (90 degrees) to reclined position (120 degrees). User-adjustable headrests are necessary for chairs reclining greater than 120 degrees. (1, pg. 88)
 - Minimum: backrest angle can achieve a position that is upright (90 degrees) or to the rear of upright (1, pg. 88)
- Backrest angle lock – **one of the following must be checked:**
 - Preferred: backrest can be locked into various positions and can move freely with user-adjustable resistance (2, pg. 13)
 - Minimum: backrest can be locked into various positions (2, pg. 13)

Armrest Features:

- Easily attachable and removable – **one of the following must be checked:**
 - Preferred: removable/attachable by end user (1, pg. 89)
 - Minimum: removable/attachable by installer (1, pg. 89)
- Armrest height – **one of the following must be checked:**
 - Preferred: armrest height is adjustable from at least 6.7 to 10.6 inches above seat (1, pg. 89)
 - Minimum: armrest height is adjustable and adjusts within the range of 6.7 to 10.6 inches (1, pg. 89)
- Armrest width – **one of the following must be checked:**
 - Preferred: at least 18.1 inches of clearance between armrests and armrests adjust in/outwards and pivot (1, pg. 89)
 - Minimum: at least 18.1 inches of clearance between armrests (1, pg. 89)
- Armrest shape – smooth, flat, padded with no hard edges or materials (1, pg. 89)

Value-added Features: Recommended, Not Required:

- Chairs are delivered to campus assembled
- Instructions for warranty and maintenance issues are provided
- Available in upholstery for both administrative, labs, and health service needs
- Samples available for Ergonomic Program review and demo rooms
- Speed of delivery/quick ship

*References: (1) ANSI/HFES 100-2007 Human Factors Engineering of Computer Workstations; (2) Ergonomic requirements for office work with visual display terminals (VDTs) ISO 9241-5:1998 (E); (3) Human Factors in Engineering and Design, Mark Sanders and Ernest McCormick, 7th edition, McCraw-Hill, Inc. 1993; (4) Ergonomics Guideline for VDT Furniture used in Office Work Spaces, BIFMA International, 2002; (5) ANSI/BIFMA X5.1-2002; (6) BSR/HFES 100 draft 3/2002

8. Ergonomics Checklist for Display Screens

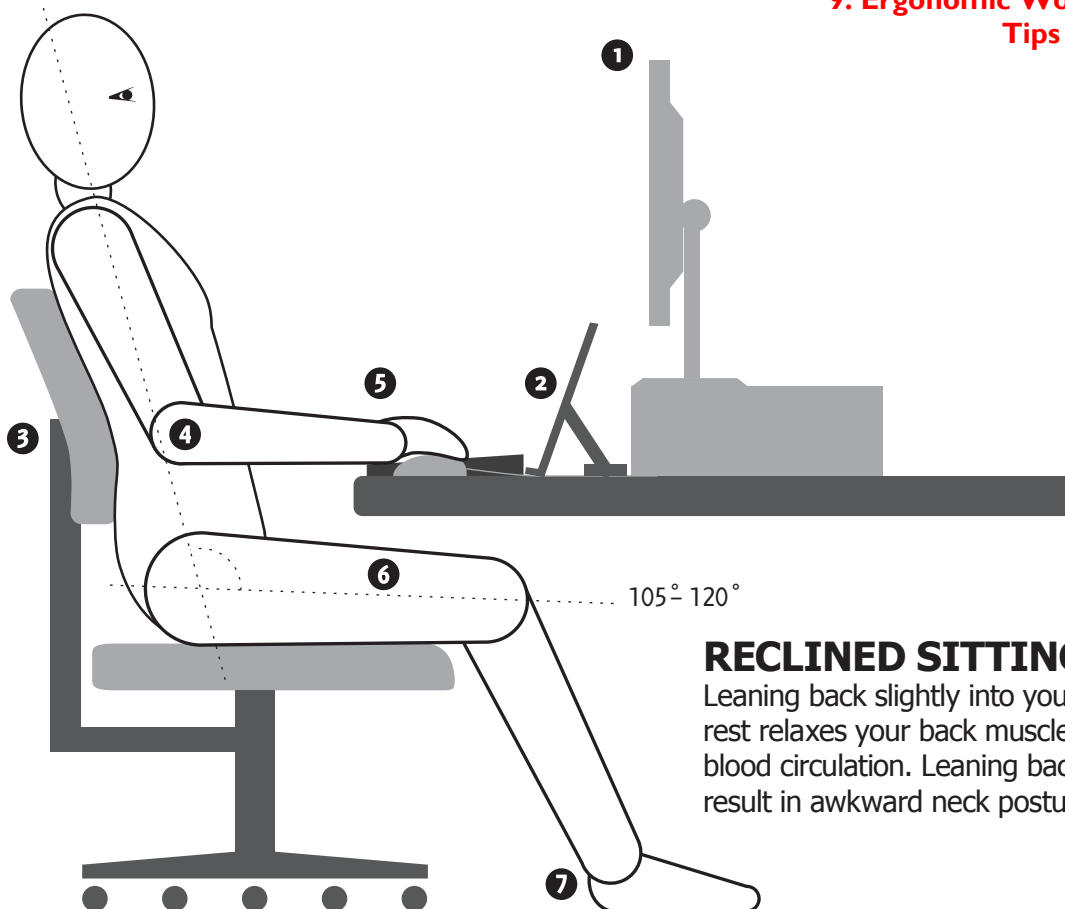
Ergonomics Checklist for Display Screens

Ergonomics@Work's Health and Safety Guidelines for Computer Users are based on the ANSI/HFES 100-2007 Human Factors Engineering of Computer Workstations standard. The display screens need to meet the minimum requirements under this standard. Use the checklist below when purchasing the display screens for your department. Please attach the manufacturer specification sheets illustrating the features on the items purchased.

Item	Guidance	Checked
Display	The use of flat-screen or antiglare devices is encouraged	<input type="checkbox"/>
	The user should have control over the tilt angle of the screen and its position on the work surface	<input type="checkbox"/>
	The user must have the capability to change the height of the screen –provide the display with a height adjustable base	<input type="checkbox"/>
	The display should be positioned such that light sources will not create glare	<input type="checkbox"/>

A USER FRIENDLY WORKSTATION

9. Ergonomic Workstation Tips for Users

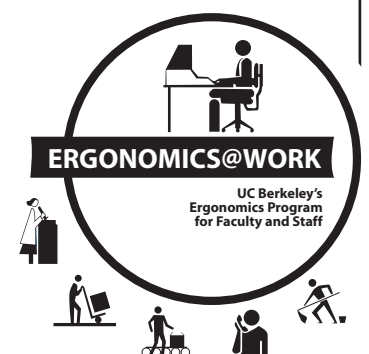


RECLINED SITTING

Leaning back slightly into your chair's back rest relaxes your back muscles and promotes blood circulation. Leaning back too far can result in awkward neck postures.

✓ CHECKLIST FOR A USER FRIENDLY WORKSTATION:

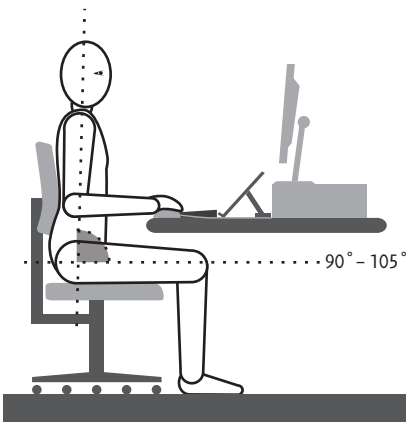
- ✓ Top of screen at eye level; lower for bifocal wearers
✓ Screen distance at arm's length (18 – 36")
- ✓ Document holder centered between monitor and keyboard or next to screen
- ✓ Chair backrest provides firm lower back support
✓ Chair back and seat easily adjustable for height and tilt by user
- ✓ Keyboard height promotes relaxed arms with forearms parallel to floor
✓ Mouse / pointing device next to keyboard
- ✓ Wrists straight (neutral)
✓ Padded, movable wrist rest, same height as front of keyboard (Do not use wrist rest while keying)
- ✓ Knees at or below hip level
✓ Ample legroom under work surface
- ✓ Feet rest firmly on floor or foot rest



ALTERNATIVE POSTURES AT A USER-FRIENDLY WORKSTATION

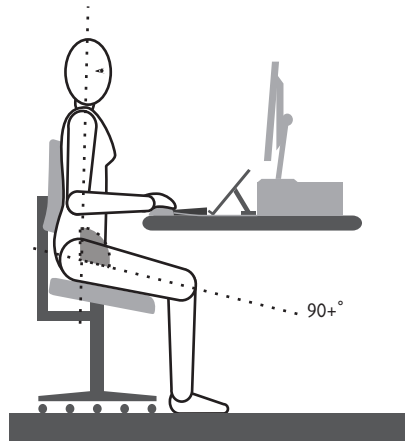
Sitting for long hours in one position—no matter how good your posture is—can be fatiguing and lead to discomfort.

- Vary your position throughout the day.
Try out some of the postures below to find out which are comfortable to you.
- Rotate your job tasks to avoid constant keyboard work.
- Take frequent, short stretch breaks to get up and move around.



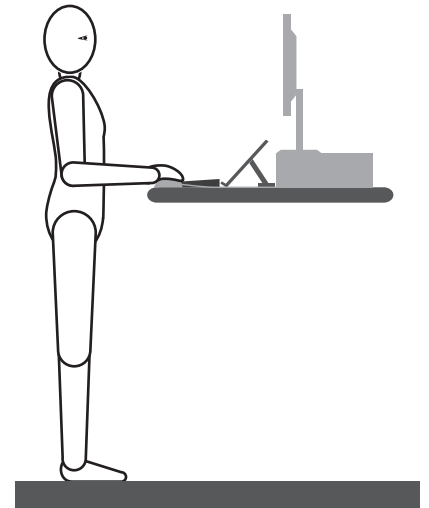
UPRIGHT

Sitting upright with your elbows, hips, and knees bent at right angles can fatigue your back muscles over time and lead to slouching.



DECLINED

Raising your chair's seat and tilting the front of it downward slightly will open your hip angle. This will also be easier on your back, but may not be comfortable if you have knee or foot problems.



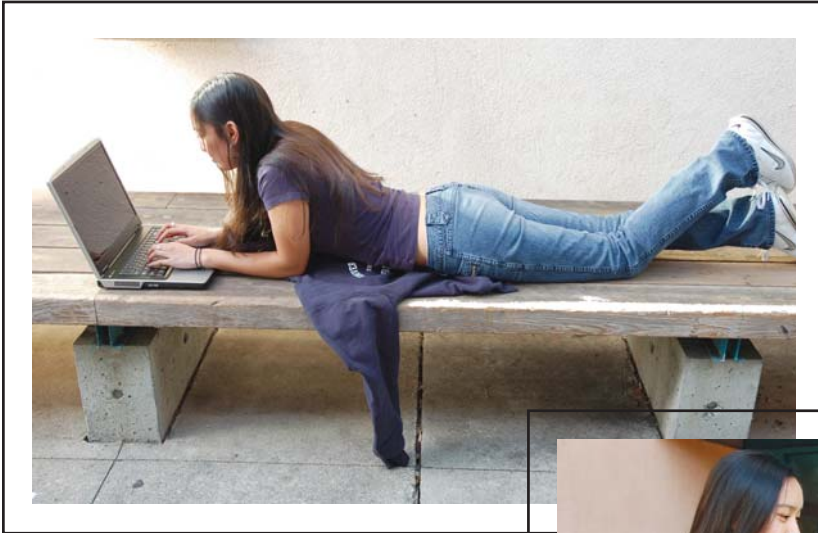
STANDING

Prolonged standing can also be fatiguing. Prop one foot up on a low footrest occasionally to shift your weight. Alternate positions include using a counter height chair or height adjustable sit/stand workstation.

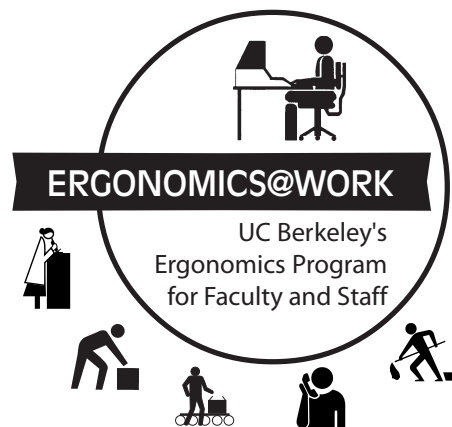
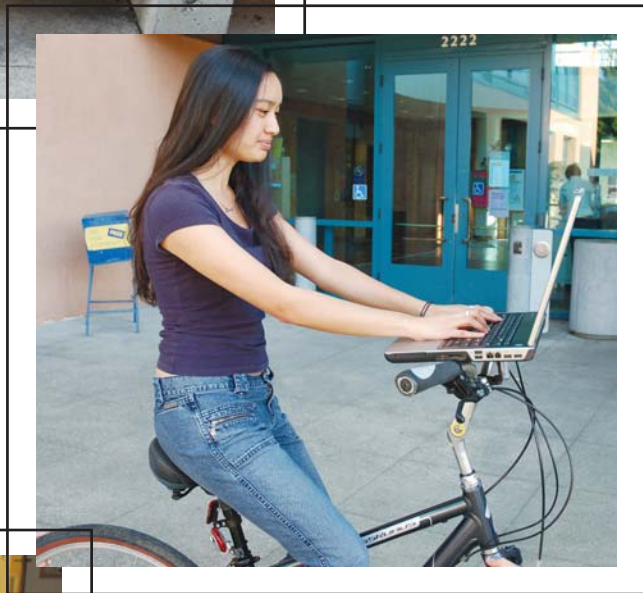
CAMPUS RESOURCES FOR COMPUTER USERS



- **Alternative keyboards and pointing devices:**
 - Workshop enrollment: UCB learning center at <http://blu.berkeley.edu>
 - Departments purchase online at <http://www.cdwg.com/berkeley>
- **Computer Health Matters ergonomics awareness training:**
 - Online training: UCB Learning Center at <http://blu.berkeley.edu>
 - In person workshop enrollment: UCB Learning Center at <http://blu.berkeley.edu>
 - Call 642-5549 to schedule training in your department
- **Keyboard shortcuts, and links to online typing tutorials at**
<http://calpact.berkeley.edu/resources/>
- **Ergonomics website:** <http://uhs.berkeley.edu/ergonomics>
- **Medical care for work-related health problems,**
Call the Occupational Health Clinic at 642-6891
- **Stretch break reminder software** downloadable at <http://blu.berkeley.edu>
under the "People" tab, "Job Tools" section
- **Vision exams:** Call University Eye Center at 642-2020 or 643-2020
- **Workstation Evaluations:** Contact your Department Computer Workstation Evaluator. Ask your supervisor, Department Safety Coordinator or call 643-2540 to find out the name of your department evaluator.
- **Workstation furniture showroom:** Call 1-877-722-9090 for an appointment



Are you using your laptop unsafely?



Ergonomic Tips for Laptop Users

Laptop computers are lightweight, portable and convenient, allowing us to keep in touch with the home, office and school from almost anywhere.

Unfortunately, the laptop's compact design, with attached screen and keyboard, forces laptop users into awkward postures. When the screen is at the right height, the keyboard position is too high; and when the keyboard is at the right height, the screen is too low.

Laptops pose less risk when used for short periods of time, but nowadays, many people use laptops as their main computer. This creates an ongoing trade-off between poor neck/head posture and poor hand/wrist posture.

This brochure provides tips on how you can set up your laptop to achieve optimal postures as well as how to transport your laptop with less wear and tear on your body.

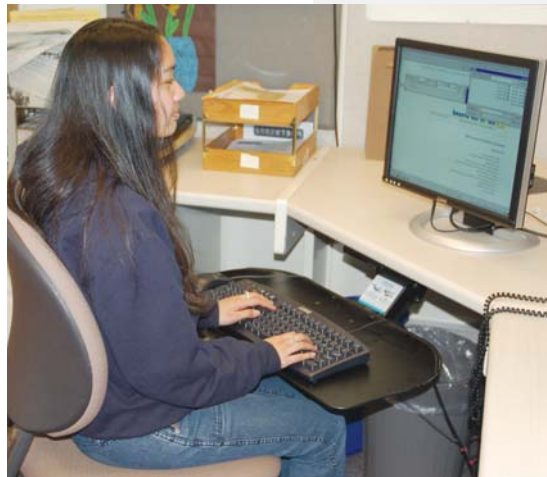


Unsafe: An ongoing trade-off between poor neck/head posture and poor hand/wrist posture.

► Setting up your laptop for frequent use

A comfortable workstation setup promotes neutral postures with the neck aligned with the spine (neutral - not bent or thrust forward), back relaxed but supported, shoulders relaxed (not hunched or rounded), elbows close to the body and bent at an angle between 90 and 120 degrees, and wrists and hands straight (not bent or turned). If you use a laptop frequently, optimize your home or office laptop workstation to promote such an ergonomic posture.

- Maintain a neutral neck posture by placing the top of the screen at about eye level or slightly lower if using bifocal glasses. Use a laptop stand or place your laptop on a stable support surface, such as monitor risers, reams of paper, or phone books so that the screen height can be adjusted.
- Attach a regular size, external keyboard and pointing device to the laptop, and place them on an adjustable keyboard tray or desk. They should be positioned at or slightly below elbow height.
- Use a docking station whenever possible to more closely resemble a standard desktop workstation where input devices can be attached.
- Angle the screen to reduce bending your head forward. Use your eyes instead of your neck to adjust your line of vision.
- Reduce glare by positioning the screen at a right angle to windows and away from overhead lighting. Laptop lights that



Safer: Below left, an ergonomic workstation promotes a neutral, comfortable posture; below right, using an external keyboard and pointing device, and raising the screen with paper reams improves this laptop workstation.



- plug into a USB port can be used to provide extra light, if needed.
- Clean the screen frequently as dust can make it difficult to read and may increase eyestrain. Be sure to use an appropriate anti-static cleaning material that is safe for laptop computers.
- Use a document holder to angle source documents vertically to promote a neutral neck posture.
- Take frequent stretch breaks every 30 to 45 minutes.

► Setting up your laptop for occasional use

If you usually use a desktop computer, but occasionally use a laptop, here are some quick fixes for short-term laptop use.

- Use a chair that supports a comfortable upright or slightly reclined posture. In a reclined position, prop your feet up to maintain a neutral trunk/thigh angle. Be sure to maintain a neutral neck posture. Use a towel roll or inflatable lumbar pillow to provide low back support.
- Place the laptop on your lap to help keep your wrists straight while keying. An empty 2-3 inch binder with the wider edge toward you knees will create an angle that will help keep your wrists straight and maximize the height of the screen.
- Don't place your laptop on top of a pillow or other soft material. The lack of circulation could shut down the fan, which can overheat the computer.
- Use a document holder to position documents vertically.
- Stand up and stretch frequently.



Safer: Above, a binder helps keep wrists straight and screen height maximized. Right, a box props up feet. Both photos, a rolled jacket provides back support.



► Carrying your laptop

The weight of a laptop and accessories can add up! Here are some ways to reduce the wear and tear on your body when transporting your laptop:

- Lighten your load by purchasing a lightweight laptop. Reduce the weight in your carrying case by removing unnecessary items, such as drivers, battery packs and cables.
- Carry your laptop in a wheeled case or a backpack with wide, padded shoulder straps and a sturdy hip belt. If this doesn't appeal to you, switch hands or shoulders frequently when using a carrying case with a handle or shoulder strap.
- When carrying files, binders, and additional items, consider putting them in a separate case to balance the load.
- Eliminate the need to carry your laptop by using portable media storage (memory stick, flash cards) or by using a virtual portal.



Unsafe: a heavy carrying case is hard on your shoulders.



Safer: Carry your laptop in a backpack with wide, padded shoulder straps.



See reverse for list of resources

Campus Resources for Computer Users

■ **Computer hardware and software:** Visit the Scholar's Workstation at <http://www.tsw.berkeley.edu/> or call 642-8424.

■ **Ergonomics website:** <http://www.uhs.berkeley.edu/facstaff/ergonomics/index.shtml>.

■ **Eye exams:** Call the School of Optometry's Eye Clinic for an appointment at 642-2020.

■ **Keyboard shortcuts & typing tutor software:** Visit the CalPACT's website at <http://calpact.berkeley.edu/>.

■ **Medical Appointments (faculty and staff):** Call the Occupational Health Clinic for work-related medical problems at 642-6891.

■ **Medical Appointments (students):** Call the Tang Center appointment office at 642-2000. Physical Therapy may be available with a medical referral.

■ **Stretch Break software (faculty and staff):** Use your Cal Net ID to download software that reminds you to take breaks. Go to blu.berkeley.edu, choose the People tab, Job Tools section.

■ Workshops:

Faculty & Staff: Free Computer Health Matters workshop on workstation setup and stretches. Enroll online: <http://hrweb.berkeley.edu/ice/home>.

Students: Repetitive Strain Injury Group Sessions. Enroll by calling 642-0607.

■ Workstation furniture and accessories (faculty and staff):

Call UC Furniture toll-free at 877-722-9090 for an appointment at the campus ergonomics showroom.

■ Workstation furniture and accessories (students):

The Back Shop in Berkeley or office supply stores. (Suggestion only—these vendors are not specifically endorsed by UC or UHS.)



There are safer ways to use your laptop! See inside...



UNIVERSITY HEALTH SERVICES *Tang Center*

II. Ergonomics Computer Workstation Survey

Survey: Ergonomics Computer Workstation Survey

Status: Launched

1. Computer Workstation Survey

Copy page •

Our building is including computer workstation ergonomics in its application to be certified as a green building. Please respond to this brief 15 question survey. Your input is important to us in assessing how satisfied you are with your computer workstation. Please answer all questions marked with an asterisk.

Please enter your name and e-mail address

First Name *

Last Name *

Email Address *

1. My workstation allows me to work in a comfortable, supported posture. * Yes No**2. My chair is comfortable, easy to adjust, and provides good back support. *** Yes No**3. My feet are supported on the floor or a foot rest. *** Yes No**4. My keyboard is at elbow height and comfortably positioned for use with my elbows close to my body and my wrists straight. *** Yes No**5. My input device (mouse, trackball or tablet) is at same level as keyboard, comfortably positioned for use with my arm close by my side and my wrist straight. *** Yes No**6. My arms and shoulders are relaxed without interference from the chair armrests. ***

- Yes
- No
- Not applicable

7. There is adequate leg clearance under my worksurface. *

- Yes
- No

8. My monitor(s) is comfortably positioned for viewing without leaning forward, bending or twisting my neck. *

- Yes
- No

9. There is no visible glare on my screen or documents. *

- Yes
- No

10. My frequently accessed items (phone, manual, etc.) are easy to reach. *

- Yes
- No

11. My document(s) are comfortably positioned near the screen for viewing without bending or twisting my neck. *

- Yes
- No
- Not Applicable

12. There is sufficient light to comfortably read my paper documents. *

- Yes
- No

13. If a large percentage of my time involves using a phone, I use a telephone headset. *

- Yes
- No
- Not Applicable

14. I take stretch breaks during the day to reduce fatigue. *

- Yes
- No

15. I am free of continuous or frequent discomfort while working at my computer workstation. *

- Yes
- No

'Thank You'/Redirect Page

Display Quiz Score
Score of 80% passes.

Passing Message:

Your responses to this survey indicate that you appear to be satisfied with the comfort of your computer workstation. If not, please contact your Department's Computer Workstation Evaluator to help you assess changes that can improve your comfort. Thank you again for taking this survey.

Failing Message

Your responses to this survey indicate that your workstation may need some improvements to make it more comfortable for you. Your Computer Workstation Evaluator will be contacting you to find ways to make improvements. Thank you again for taking this survey.

[Edit this item to change the answer key](#)