

Technology

2021-2022 Academic Year

TO: Incoming Graduate Students

Dear Students,

As an integral instructional tool, digital technology is understood as both a mode of conceptual thinking and as a set of tools for the representation of that thinking. It provides a critical framework for the exploration of multiple systems of design inquiry in our graduate programs in architecture, landscape architecture, and urban design. While an emphasis on conceptual thinking and on representation is, of course, not exclusive to digital technology, the School's teaching addresses the complete range of modes of thought and techniques.

State-of-the-art digital technologies are fully integrated in the design curriculum. In addition, there is ongoing investment in and improvement of the School's facilities and electronic infrastructure for research, teaching, presentation, CAD/CAM, rapid prototyping, and general computing.

The Graduate School of Architecture & Urban Design emphasizes the use of laptops as the basic digital tool in the design process, facilitating digital media-based education in our classrooms and studios. The School's pedagogy relies upon a decentralized, dynamic, and mobile environment tailored to individual needs and contemporary use. This model provides a more sophisticated integration of computing in the design studio, classroom, and workshop.

The following pages reflect our digital technology pedagogy, while recognizing the ever-changing pace of technology and user preferences. While we understand that students have a number of options for securing both hardware and software, our faculty, staff, and students collaborate yearly to provide the most up-to-date information to aid you in this process.

All first-year students are required to purchase Adobe CC through the University. The University has secured a highly reduced annual cost of \$50 per license. This cost will be billed to your WashU student account and a license will be issued to you at the beginning of August to your wustl.edu email. You will continue to be billed each year while you are a student for this license.

Richard Viehmann coordinates digital technologies for the School working with the faculty and with the Information Technology staff. If you have questions about digital technologies, please contact Richard at 314.935.9286 or viehmann@wustl.edu; he can assist you or direct your question to the right personnel.

In the meantime, I look forward to an exciting fall semester and the opportunity to work with you throughout your educational career at the Sam Fox School.

Sincerely,

Heather Woofter

Director, College of Architecture | Graduate School of Architecture & Urban Design
Sam and Marilyn Fox Professor

Cc:

Derek Hoeflerlin

Monica Rivera

Kathleen O'Donnell

Audrey Treece

Richard Viehmann

Associate Professor and Chair, Urban Design, Landscape Architecture

Professor of Practice and Chair, Architecture

Graduate Admissions Coordinator

Programs Manager

Senior Computer Systems Manager

Hardware

In order to fully engage in the pursuit of their studies, all new graduate students at any curricular level must have their own computer by the beginning of orientation. Your computer should meet the following minimum specifications to both reduce the need for systems administration and to provide the best foundation for all digital course work.

Minimum System

- Dual Core Intel i5 Processor
- Integrated Wireless-N Network Card
- RAM 16 GB
- HDD 500 GB hard drive
- Video card with 1 GB of dedicated RAM
- Windows “Professional” Operating system

Recommended System

- Quad Core i7, either fast Coffee Lake or Sunny Cove
- Network Card: Wireless 'N' Capable
- RAM 32 GB
- 400 GB or larger SSD (Solid State Drive)
- 4 GB Dedicated Video Card
- HD, 2x HD, or 4K display
- Video card: Quadro K2300 or GTX 980
- Windows “Professional” Operating system

We also highly recommend:

- A minimum of a 15-inch display (if going the laptop route)
- External hard drive of 1 TB, for secure storage of backup files
- Computer lock for use in studios
- Damage warranty provided by manufacturer (3-year period with next-day service is highly recommended)
- We highly recommend you also include all your technology under your home or renter’s insurance

While we have recommended a range of systems, your personal preference may influence your final decision. For example, many students prefer a MacBook Pro with both Windows and Mac OS X platforms installed. While this option offers a mix of power, portability, and durability, it requires going back and forth between platforms. If you want a one-platform PC, the University has an agreement with Dell that offers discount pricing to all WUSTL students. More information about computer options (laptop or desktop, Windows or Mac, etc.) can be found later in this letter, beginning on Page 4. Purchasing a computer that exceeds the minimum requirements will better serve your technology needs.

Software

The following is a list of software we anticipate you will need during the course of your studies in the Graduate School of Architecture & Urban Design. It is recommended that you discuss and/or review the requirements for each class as this can change from time to time.

- Rhino 6.0: NURBS modeling tool for complex digital constructions; best suited for CNC milling and 3D printing; requires Windows platform
- AUTOCAD: Basic CAD/CAM and drafting tool for 2D constructions and laser cutting; requires Windows platform (can be obtained for free by WUSTL students through Autodesk)
- Adobe® Creative Cloud®: Includes the full Adobe Creative suite, including Photoshop, Illustrator, and InDesign; also includes tools for image manipulation, presentation in vector formats, and construction of visual data as raster files
- V-Ray 4.0 Plug-in for Rhino: Advanced rendering software for photo real global illumination process; requires Windows platform
- Maxwell Plug-in for Rhino: Advanced rendering software for photo real rendering linked directly to a physical camera paradigm to provide a simplified rendering experience
- Autodesk 3D Studio Max: Requirement **ONLY** for MLA students (can be obtained for free by WUSTL students through Autodesk)
- GIS: Students can request a copy by going to the GIS Office at <http://gis.wustl.edu/gisweb/current-students/resources/>
- Microsoft Office Suite: Includes Word, Excel, PowerPoint, and Outlook (can be obtained for free by WUSTL students by going here <http://email.wustl.edu/office-apps/>)

Software Acquisition

Students are responsible for acquiring their own software. Software that is available at a discounted student rate or those free from WUSTL can be accessed at <http://samfox.onthehub.com>. The following software is available to registered WUSTL students for free:

- All Autodesk software: Students must register their school email at autodesk.com/student and download AUTOCAD. MLA students will use 3D Studio Max in their third semester, and MArch students may elect to use Revit later. However, you are free to use any of the Autodesk tools you find helpful.
- Microsoft Office software: Once you have a WUSTL email and log in account, you can download the software from <https://email.wustl.edu/office-apps/>.

Purchasing Software

The following vendors have priced packages for the additional required software:

- Studica.com: <http://studica.com>
- Campus Book Store: <http://www.bkstr.com/washingtonstore/home>
- Autodesk: <http://www.students.autodesk.com>
- Rhino: All students MUST buy the academic version of Rhino from <http://www.novedge.com/products/2572>. **DO NOT** install a demo version.
- Apple: http://store.apple.com/us/browse/campaigns/education_pricing
- Dell: <http://premier.dell.com/portal/messages.aspx?c=US&l=en&s=hied&cs=RC805504>
- Adobe® (Purchased for you through WashU. You will be notified with information)

Training

Hardware and software acquisition and installation are your responsibility. The School and its staff are not responsible for individual student computers and their maintenance. We recommend that you obtain a 3-year warranty package for next-day manufacturer service from any vendor.

There will be workshops offered on-campus at the start of the academic year that will include:

- a. Network connections for Internet and printing
- b. Best practices for computer maintenance and backups, and software installation and use
- c. Tours of resources throughout the School's facilities

In addition, our Information Technology team is available for one-on-one consultation by appointment and has a robust presence on the [Sam Fox School intranet](#). Students may also contact the WUSTL Student Technology Services team, located near the residential halls on the South 40, for support. In addition, software training will be provided in various courses.

Financial Aid

If you are a U.S. citizen or permanent resident with financial aid, you can borrow funds to assist with the purchase of your computer. If requested, an additional student loan to cover your computing expenses will be added to your existing loan package and disbursed at the same time as your fall loans – i.e., the week before the first day of class. Federal regulations prohibit the disbursement of student loan funds earlier than this date, so if you wish to purchase your computer over the summer, you will need to cover the purchase cost and the student loan to cover this expense will be disbursed at the beginning of the semester. If you believe that additional loan funds are necessary to support the purchase of a computer/software, contact Todd Farr, Financial Aid Awards Associate, at 314.935.3642 or tfarr@wustl.edu.

Recommendations: First Year

We recommend that you acquire a computer and required software during the summer. These tools are essential for your graduate school career, and it is important that your computer is ready to go when you arrive on campus for the fall semester. Students can download the most recent software for free at <http://samfox.onthehub.com>.

All first-year students are required to purchase Adobe Creative Cloud through the University. The University has secured a highly reduced annual cost of \$50 per license (regular retail cost is \$240 per year). This cost will be billed to your WashU student account and a license will be issued to you at the beginning of August to your wustl.edu email. You will continue to be billed each year while you are a student for this license.

You will also need to have a way to organize large numbers of photos, either through Windows or a program like Apple's Aperture or Adobe Lightroom (Lightroom is included with Adobe® Creative Cloud®).

MArch and MLA students will need Rhino after fall midterms; MUD students should install Rhino before the start of the fall semester.

We advise that you wait on the rest of your purchases because instructors change software requirements from time to time; you might choose electives that focus on certain software; or your classmates may assist with some specific technology recommendations. If you need additional software, you will be given enough time to procure it.

Preparing for your Second Semester in Architecture

We recommend that MArch students wait until winter break to prepare for the second semester of your studies. The 318 Studio and Environmental Systems I for MArch 3 students may adjust requirements from time to time, so please wait for your faculty to tell you what you will need for your second semester. In previous years, these courses have used: T-Splines (available for free for students from autodesk.com), Grasshopper (free download from grasshopper3d.com), V-Ray (from novedge.com/brands/80), DIVA (free for students from diva4rhino.com), Autodesk Vasari (free from autodesk.com), and Climate Consultant (free from energy-design-tools.aud.ucla.edu).

Laptop or Desktop

While most students have laptops, a desktop PC will offer more speed for your money. However, if you anticipate working away from School (or studying abroad) you might prefer a laptop. Most work will take place in studio, but you may need to work off site or take notes in lectures. Many students also prefer to connect their own computers to classroom projection systems for presentations. Many students take notes in lectures using a laptop or a tablet, although taking handwritten notes and sketching are useful skills to develop if you're more comfortable with paper. Another option is to purchase a desktop computer (which is less expensive) and have a tablet-type device for on-the-move activity or in-class notes.

Regardless of your choice, most students prefer working with a high-quality external monitor(s), both to reduce eyestrain and increase virtual working space.

Windows or Mac

Most of the architecture industry uses a Windows-based platform. If you want to simplify your technology management, we advise that you use the Windows platform as opposed to running both Windows and Mac on the same system.

If you intend to purchase a Mac, please consider the following:

Boot Camp

Boot Camp is software provided by Apple that enables you to install and run Windows on your Mac. You have to buy an Intel chip system. M1 chip is not compatible with boot camp. At start-up, Boot Camp requires you to choose which operating system—either Windows or Mac OS X—you will use. If you need to switch to the alternate operating system, you have to restart your computer. Windows is necessary as it supports the Rhino plug-ins (Grasshopper, T-Splines, V-Ray) necessary for work in the MArch program, as well as the GIS software that is used in the MLA and MUD programs.

You must start by setting up Boot Camp (see <https://support.apple.com/en-us/HT201468> for information). **It is highly recommended that you set up Windows as soon as possible, prior to the start of the academic year.** Boot Camp can be difficult to set up if you've been using your computer for a while, resulting in large files being saved in odd locations. It can be difficult to move some of these files to make room for Windows. If this happens, you have two options: 1) back up your computer, erase the hard drive, restore from the backup, and try again, or 2) go to an Apple store. Either of these options can take some time, so it is wise to set up Windows during the summer. This will ensure that you are completely prepared for the start of the academic year, when time will become precious.

For the Technically Inclined

Most of our workflow is CPU-frequency bound, so get the fastest cores you can.

- Modeling in Rhino only uses one processor core and uses your graphics card only to draw the viewports (which can become taxing with many lines).
- AutoCAD relies only on CPU and RAM, and our usage of it is generally light.

- Adobe Creative Suite/Creative Cloud benefits from fast hard drives and large amounts of RAM since many programs cache edits and layers. (This will be a required purchase through the University and billed to your WU student account and a license log will be sent to you on August 1st from WU)
- Rendering with V-Ray (which is done on the CPU; V-Ray RT uses the GPU for preview rendering, but it's new and does not produce the highest-quality images yet) uses multiple cores efficiently, but this is less of a priority since there are cloud-rendering services and the School-provided render farm. You won't make many renderings your first year.
- Maxwell, which some say produces nicer images than V-Ray, is much more resource-intensive.
- 3D Studio Max benefits from a strong GPU more than other programs.

Gaming graphics cards work well most of the time. 3D Studio Max and Maya have DirectX viewport support, so they do particularly well with gaming cards. Quadro and FirePro cards offer better drivers that are optimized to work with professional software, but they cost substantially more. They also offer more OpenGL performance than their higher-spec gaming card siblings, which is what Rhino primarily uses. SLI and Crossfire provide no gains for professional software.

Recommendations for a good mid- to high-range computer to build as a desktop; the first two items on this list are the most important to consider:

- Quad Core i7; a great choice with an excellent ratio of price to performance is the i7 3930 (-k for overclocking)
- 400 GB or larger SSD (try RAID 0+1 for more fun)
- 32 GB of RAM (the more available DIMM slots on the motherboard, the better)
- 4GB dedicated CPU video card (Rhino has some quirks with graphics cards, so don't go crazy here unless you really like video games)
- HD, 2x HD, or 4K display

Our School network is much faster if you connect to the wired Ethernet ports provided near each studio desk.

Optional Tutorials for All Levels

Beginner Tutorials

If you have the desire, you can use Lynda.com to familiarize yourself with Adobe software and Rhino. Lynda.com is free to all Sam Fox School students. Go to Lynda.com and use your WUSTL ID to log in through the institution link.

For your courses, you will start out in Adobe programs, mostly making compositions based on Layers, Adjustment Layers, Selection Tools, and Layer Masks.

To support this work, you should look at:

- AutoCAD Essential Training
- Illustrator CC Essential Training
- Photoshop CC Essential Training
- InDesign CC Essential Training
- Rhino 6.0 Essential Training

Some additional free resources:

- Digital Toolbox [Rhinoceros and Grasshopper]: digitaltoolbox.info
- Deprocess [Adobe, 3ds Max, Rhino, Grasshopper]: deprocess.org/category/tutorials
- Creative Cow [mostly Adobe, but some others as well]: library.creativecow.net
- Vimeo [search for tutorials]: <https://vimeo.com/>

Animation

The MUD program summer studio and the 501 studio of the MLA program include advanced animation techniques, and the MArch program also uses animation in some coursework. You could start looking at that now if you have time and are already familiar with the Adobe software listed above.

Tutorials from Lynda.com to review:

- After Effects CC Essential Training (beginner, broader overview)
- After Effects Apprentice Series (beginner, more in-depth)

- 3ds Max Essential Training (beginner, broad overview, getting started)
- 3ds Max Textures and Materials (intermediate, skill focus)
- 3ds Max Lighting and Rendering with mental ray (intermediate, skill focus)
- 3ds Max Getting started with Reactor (advanced, skill focus)
- 3ds Max Particle Effects (advanced, skill focus)
- Creating Simulations in MassFX and 3ds Max (advanced, skill focus)

Advanced Adobe, Scripting, and BIM Tutorials

Students with more advanced knowledge may want to brush up or get back into the swing of things. Try these Lynda.com tutorials:

- Photoshop CC One-on-one Series (series of 4 tutorials that go into more depth and expertise)
- Illustrator CC One-on-one Series (series of 4 tutorials that go into more depth and expertise)
- AutoCAD Essentials Series (series of 6 tutorials that go into more depth and expertise)

Scripting is a topic of increasing importance. If you're solid on the basics, you might start learning those skills. Try the Digital Toolbox and Deprocess tutorials on Rhino and Grasshopper mentioned above.

Although the School won't require you to use Revit outside the BIM elective, it is a great skill to have, and many studio professors allow you to use any software that will help you to most efficiently and effectively make your work. If you want to learn a bit more about modeling and scripting, or go beyond the first semester, try these tutorials on Lynda.com:

- Python 3 Essential Training (scripting)
- Revit Architecture Essential Training (CAD & BIM)
- Revit Architecture: Rendering (lighting, animation, walkthroughs)

Contacts for Questions

Technical questions or questions related to the purchase of equipment should be directed to:

Richard Viehmann
 Senior Computer Systems Manager
 viehmann@wustl.edu
 314.935.9662