# New Student Guidebook

## Department of Biostatistics & Informatics

## Colorado School of Public Health

## University of Colorado Anschutz Medical Campus

# Welcome!

Dear new students,

We are thrilled that you have decided to pursue your graduate studies in Biostatistics within the CU Anschutz Department of Biostatistics & Informatics! Now that you have accepted your offers of admission, we wanted to provide you with some resources you may find useful as you prepare for the fall.

For those of you moving to the Denver area for the first time, we've compiled some tools to help you find housing and connect with potential roommates. To help you feel prepared for your first year of coursework, we've included directions on how to access free, online training in SAS and R programming. Lastly, we've provided some guidance and review resources to help you brush up on your calculus and linear algebra. Some further materials may be provided by instructors of individual courses. Thanks to current and former Biostatistics students Jessi Shaw, Sarah Ryan and Kevin Josey for help with this.

If you have any questions between now and the start of the fall semester, please don't hesitate to ask. We're happy to help however we can.

Best,

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# Housing & Transportation

As many of you know, the Anschutz Medical Campus (AMC) is primarily a commuter campus. While there are some apartments on campus, the vast majority of AMC students live in Denver and in other nearby cities. Below are some resources to help you start your housing search.

## *Housing "on" campus*

www.21fitzsimons.com

## *Introduction to Denver neighborhoods*

http://www.denver.org/about-denver/denver-neighborhoods/

http://hotpads.com/blog/coolest-neighborhoods-denver/

## *Housing search resources*

- Map-based search tools to view Craigslist housing listings on a map, filter results, and save favorites:

  www.padmapper.com

  www.hotpads.com

- Denver Police Department interactive crime map:

  https://www.denvergov.org/content/denvergov/en/police-department/crime-information/crime-map.html

## *Transportation resources*

- **Parking:**

  http://www.ucdenver.edu/about/departments/FacilitiesManagement/ParkingMaps/Parking/Pages/PermitParking.aspx

  http://www.ucdenver.edu/anschutz/studentresources/student-assistance/student-resources/Pages/Parking-Transportation.aspx

- **Denver light rail:**

  http://www.rtd-denver.com/

- **Intercampus Shuttle Service** (Anschutz | Denver VA | Nat. Jewish Health | Lawrence St. Center)

  http://www.ucdenver.edu/about/departments/FacilitiesManagement/ParkingMaps/Pages/ShuttleService.aspx

## *Roommate search tools and resources*

The Anschutz Medical Campus offers roommate matching and other services to help you get established.

- **Office of Campus Student Services:**

  http://www.ucdenver.edu/anschutz/studentresources/student-assistance/housing/Pages/home.aspx
- **CSPH Social Club Facebook group**:

  https://www.facebook.com/groups/1503094119979103/
- **CU Public Health Students Facebook group:**

  https://www.facebook.com/groups/534131123265127/

# Preparing for first-year coursework

As first-year MS and PhD Biostatistics students, you will complete a sequence of core courses in Statistical Theory, Biostatistical Methods, and Statistical Consulting. Each of these courses incorporates SAS programming, R programming, or both. If you don't have much statistical programming experience, or if you are feeling a bit rusty, we highly recommend that you take advantage of the following free, online training resources before the start of the fall semester. For both SAS and R, see the labs and other material in the Packet for Incoming Students.

## *SAS: Access and Learning Resources*

MS and PhD Biostatistics coursework relies heavily on the use of SAS and R software to demonstrate and reinforce statistical concepts. Having a strong foundation in basic SAS and R programming will allow you to focus on understanding the higher-level concepts taught in your first year of courses. Below you will find information on accessing SAS and R, and SAS and R training materials.

### SAS access options

| Access option | Description |
|---|---|
| Campus computer labs:<br>▪ Education 2 North, 2201 Lab C<br>▪ Research Center 1, 1309 | Available to students and staff 24 hours a day, when not reserved for classes and meetings.<br>To view lab availability, visit https://schedule.ucdenver.edu/virtualems/BrowseFacilities.aspx and view the Availability for rooms "P28-CTL-2201C-Computer Lab" and "P28-CTL-2201C-Computer Lab." |
| Purchase a SAS license ($80/year) | To purchase a SAS license, follow the instructions provided at http://www.colorado.edu/oit/software-hardware/site-licenses/sas.<br>**Important note:** SAS is only compatible with Windows operating systems. Students who wish to use Mac computers will need to install Parallels or a similar program to allow for running Windows on an OSX operating system, or use SAS Studio as described below. |

SAS access options, continued

| Access option | Description |
|---|---|
| SAS Studio for Academics | SAS studio is an online version of SAS which can be run from any operating system with a working internet connection. This option is free to students. Visit http://www.sas.com/en_us/industry/higher-education/on-demand-for-academics.html and register as an "independent learner." Note that SAS Studio has been known to have problems with service outages and other limitations. |
| OIT Remote Computing with persistent environment | For $15/month a student can access a remote computer with a 'persistent environment' and a Windows operating system capable of running SAS. This service, offered by the Office of Information Technology (OIT), may be helpful for students who do not already own Windows-based computers or whose personal computers are not very powerful.<br><br>A remote computer running Windows can be accessed from any computer, including those running Mac and Linux-based operating systems. A persistent environment means that the remote user can save files and install programs like SAS. Once a remote computer is set up by OIT, the student will still need to purchase a SAS license and install SAS on the remote desktop. OIT may or may not be able to help with SAS installation.<br><br>For more information, visit: http://www.ucdenver.edu/about/departments/ITS/servers/Pages/RemoteComputing.aspx |
| SAS University | See handout in Packet for Incoming Students. This seems to be the easiest approach, especially for those who use Mac. |

## *SAS: Access and Learning Resources, continued*

### Free SAS training

CU Denver students have access to $9,750 worth of SAS training for free. Of the many courses offered at no cost, the following courses are likely to be the most beneficial to new students in the MS or PhD Biostatistics program who would like to review or get a jump start on learning SAS. Note that some of these resources may be available only after you have obtained your @ucdenver.edu email.

| e-Learning course | Level | Normal Price |
|---|---|---|
| SAS(R) Programming 1: Essentials | 2 Fundamental | Free |
| SAS(R) Programming 2: Data Manipulation Techniques | 3 Intermediate | $1170 |

### To access free SAS e-Learning:

Go to https://oit.colorado.edu/software-hardware/site-licenses/sas
Under Training and Resources, follow links and instructions to set up your SAS e-learning account. The activation code for CU can be requested from sitelic@colorado.edu.

### Additional SAS resources

The following websites also provide free, well-documented tutorials on programming and statistics. You may find these sites helpful as you review for the fall and throughout your first year of classes.

| Resource | URL |
|---|---|
| SAS Free Tutorials | http://support.sas.com/training/tutorial/index.html |
| UCLA Institute for Research and Education | http://www.ats.ucla.edu/stat/sas/ |

## *R and R Studio: Downloads and Learning Resources*

New students lacking R programming experience or in need of a review might benefit from using the following learning resources. Because R is an open-source software, there is a wealth of information and training available for free online.

### Helpful Resources

| Resource | Type | URL |
|---|---|---|
| SWIRL | Interactive | http://swirlstats.com/students.html |
| Datacamp “Introduction to R” | Interactive | https://www.datacamp.com/courses/free-introduction-to-r |
| UCLA Institute for Research and Education | Tutorial(s) | http://www.ats.ucla.edu/stat/r/<br>http://www.ats.ucla.edu/stat/r/modules/ |
| Cyclismo.org, developed by Kelly Black, PhD at the University Of Georgia Dept. of Mathematics | Tutorial | http://www.cyclismo.org/tutorial/R/<br>http://www.cyclismo.org/tutorial/R/probability.html |
| Tom Short’s Rhort Reference Card” | Quick reference | https://onlinecourses.science.psu.edu/statprogram/sites/onlinecourses.science.psu.edu.statprogram/files/lesson00/Short-refcard.pdf |
| Data Science 101 by Roger Peng, Phd at Johns Hopkins University | Video | http://datascience101.wordpress.com/2013/01/30/videos-for-learning-r/ |

## *Review: Calculus and Linear Algebra*

Statistical Theory I and II rely heavily on the concepts and skills listed in the table below. It is extremely important that you have fluid knowledge of these topics when you begin your first semester of Statistical Theory. It is highly recommended that you review and work through practice problems now, as there is little time for review during the semester.

| Review Concepts |
| --- |
| General computational fluency:<br>▪ Properties of logs, natural logs, and exponential functions<br>▪ Manipulation of inequalities, absolute value functions, sigma notation, and linear operators |
| Limits (finite and infinite):<br>▪ Definition of continuity<br>▪ Limit definition of the constant e |
| **Basic probability concepts:**<br>▪ Set theory<br>▪ Permutation and combination formulas<br>▪ Application of the First and Second Fundamental Theorems of Calculus to probability |
| **Integration and differentiation, particularly:**<br>▪ First and second derivatives using the chain rule, product rule, and quotient rule<br>▪ Identifying maxima and minima<br>▪ Single and double integration (Fubini's theorem) using the power rule, u-substitution, and integration by parts<br>▪ Integration and differentiation of exponential functions and natural logs<br>▪ Univariate and bivariate partial differentiation<br>▪ Bivariate change of variables with a Jacobian<br>▪ Leibniz rule for the case of constant limits of integration |
| **Sequences and series, particularly:**<br>▪ Arithmetic ($\sum_{i=1}^{n} c$, $\sum_{i=1}^{n} i$ , $\sum_{i=1}^{n} i^2$ ), Taylor, Binomial, Geometric, and power series<br>▪ Alternating sequences and series<br>▪ Convergence and divergence tests and theorems |

## *Calculus and Linear Algebra Review, continued*

Listed below are some review resources to get you started.

### Resources for Review

| Resource | Type | Description |
|---|---|---|
| Paul's Online Math Notes – Lamar University | Comprehensive review of Calculus I, II, III in the form of notes, practice problems, and quick reference study guides organized by topic | http://tutorial.math.lamar.edu/ |
| Penn State University Applied Statistics Program | Calculus review tailored to statistics students | https://onlinecourses.science.psu.edu/stat program/calculus_review |
| MIT OpenCourseWare | Review of basic probability concepts | http://ocw.mit.edu/index.htm<br>http://ocw.mit.edu/courses/mathematics/18-05-introduction-to-probability-and-statistics-spring-2014/readings/MIT18_05S14_Reading1b.pdf<br>http://ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/ |
| UC Davis Math Department | Calculus practice problems organized by topic. | https://www.math.ucdavis.edu/~kouba/ProblemsList.html |
| Penn State University Applied Statistics Program | Review of matrix algebra for statistics students | https://onlinecourses.science.psu.edu/stat program/matrix_review |

# Other Student Resources

## *Health Services*

Students have access to convenient health care services on the Anschutz Medical campus. For more information, read below and visit UCDENVER.EDU/ANSCHUTZ/CAMPUSHEALTH.

## *Additional Information and Resources*

Students may find additional helpful information here:
http://www.ucdenver.edu/anschutz/studentresources/student-assistance/student-resources/Pages/home.aspx