

I have mentored several students and fellows during my time as an Assistant Professor in Biochemistry and Molecular Genetics and Associate Professor of Genetics and Genome Sciences. I currently mentor one UVA MSTP student, one UCHC MD/PhD student, two UCHC PhD students, and an in-residence Assistant Professor. In addition to mentoring, I have enjoyed teaching molecular biology, genetics, biochemistry, writing, and genomics in lecture, journal club, and discussion formats. At UVA I was an instructor of Cell 8450-Scientific Writing for Grants and Fellowships, director of the Biochemistry and Molecular Genetics Journal Club, and director of the Cell and Molecular Biology training grant Data Club. I lectured in several classes offered at UVA and participated in active learning modules with medical and graduate students. I developed analysis vignettes to teach students bioinformatics and communicate my research. These teaching materials served as a foundation for informal computational or bioinformatics training to students throughout the graduate program.

Since arriving at UConn Health in the summer of 2021, I developed MEDS5420 and I am the sole instructor for this course (Springs 2022 & 2023). I also mentor students who write F30 proposals and I participate in the Foundations class.

Direct Teaching Activities

Teaching evaluations are available in **Appendix A**

A teaching award nomination packet that was initiated and compiled by students is included in **Appendix A**

Since arriving at UConn Health

Discussion leader/Lecturer in Foundations of Biomedical Sciences I Fall 2023

I provide a lecture on transcription and I present a specific paper and steer the first-year students through the paper by asking questions, making sure the group has a good grasp on the paper and techniques, and ensuring that every student engages in the discussion.

MEDS 5420 Molecular Genomics Practicum (Bioinformatics) Spring 2022,2023

Role: course director and sole instructor

Coupling classical molecular biology techniques to high throughput sequencing for nucleic acid detection has revolutionized how scientists study biology. I developed MEDS5420, which introduces students with no computational background to the command line and gradually builds upon concepts and skills so that students are capable of building workflows to process and analyze high throughput sequencing data. After basic concepts and command line competency are established, the course focuses on the analysis of ChIP-seq, RNA-seq, and ATAC-seq data. Students learn to use many common genomics software packages to perform such tasks as genome alignment, peak calling, motif analysis, and differential expression analysis. Students are introduced to the statistical computing language R and perform analyses and visualization using an R interface.

MEDS 6501 Communications for Biomedical Scientists Fall 2022, 2023

Role: instructor (course director: Christopher Heinen)

As an instructor of this scientific writing for grants and fellowship course, I lead mock study sections and provide in depth feedback for 8 students. The class trains students to develop and communicate a coherent research proposal.

F30 Grant submission workshop (Writing)

all year 2022 - current

Role: instructor (course director: Kimberly Dodge-Kafka)

As a faculty advisor for MD/PhD scientific writing students, I provide in depth feedback for 3-5 students per semester who are submitting F30 grants. We train students to develop a competitive research proposal. Students submit F30 proposals at the conclusion.

Discussion leader Foundations of Biomedical Sciences I

Fall 2021

Course directors: Stormy Chamberlain and Chris Heinen

Sandra Garrett and I present a specific paper and steer the first-year students through the paper by asking questions, making sure the group has a good grasp on the paper and techniques, and ensuring that every student engages in the discussion.

Previously at UVA

Lecture, PHS 5705, course director: Charles Farber

Spring 2021 (2 hours)

“The Transcriptome: a biological perspective”

The lecture included an overview of various genomic technologies used to measure transcription and chromatin structure. I also provided examples of how these methods have been used to inform on basic biological processes, such as development and disease biology. I developed a final exam question for the students that incorporates principles of the lecture.

Instructor Cell 8450, course director: James Casanova

Fall 2020 (20 hours)

As the instructor of five graduate students of the scientific writing for grants and fellowships class, I lead the discussion and provide feedback for students who develop an F30/F31 style research proposal. The 10 week course is designed to train students on how to develop a competitive research proposal. The students are able to submit polished proposals to the NIH or a relevant funding agency at the conclusion of the class.

Instructor BIOC 8145, course director: Stefan Berkiranov

Spring 2020 (10 hours)

BIOC 8145 provides the statistical and programming background as well as introduction to software tools that enable analysis of functional genomics data sets. The course focuses on identifying single nucleotide and structural variants from genomic data, gene expression changes from RNA-seq and PRO-seq data, factors that regulate gene expression including transcription factors (TFs), histone modifications and chromatin state from ChIP-seq and ATAC-seq data and cellular composition and single cell gene expression from scRNAs-seq. Students will learn UNIX basics, statistics associated with each analysis approach, programming in R, and analysis of RNA-seq, PRO-seq, scRNA-seq, ChIP-seq and ATAC-seq data using R/Bioconductor and UNIX-based software tools. Students will also learn how to perform TF DNA motif and GO/pathway enrichment analysis.

Lecture, PHS 5705, course director: Charles Farber

Spring 2020 (2 hours)

“The Transcriptome: a biological perspective”

The lecture included an overview of various genomic technologies used to measure transcription and chromatin structure. I also provided examples of how these methods have been used to inform on basic biological processes, such as development and disease biology. I developed a final exam question for the students that incorporates principles of the lecture.

Director CMB training grant data club

2019/20 (15 hours)

Every month current and past appointees to the CMB training grant meet and two trainees present their latest research. Students meet with a faculty advisor outside their field to prepare the presentations, with an emphasis on communicating their research to scientists from diverse academic backgrounds. My role as the

director of the data clubs is to facilitate discussion amongst the students and provide thoughtful and critical feedback to the presenters.

Instructor Cell 8450, course director: James Casanova

Fall 2019 (20 hours)

As the instructor of five graduate students of the scientific writing for grants and fellowships class, I lead the discussion and provide feedback for students who develop an F30/F31 style research proposal. The 10 week course is designed to train students on how to develop a competitive research proposal. The students are able to submit polished proposals to the NIH or a relevant funding agency at the conclusion of the class.

Course Director BIOC 8150

Fall 2019 (22 hours)

Every week all BIMS BMG students meet to listen to either two seminars from other students or a single research seminar. All students are required to present their research once a year. Students are encouraged to engage with the speaker through questions and all students provide feedback for the presenting students. These seminars also expose trainees to a diversity of scientific topics and presentation styles.

Director CMB training grant data club, CMB TG PI: Todd Stukenberg

2018/19 (15 hours)

Every month current and past appointees to the CMB training grant meet and two trainees present their latest research. Students meet with a faculty advisor outside their field to prepare the presentations, with an emphasis on communicating their research to scientists from diverse academic backgrounds. My role as the director of the data clubs is to facilitate discussion amongst the students and provide thoughtful and critical feedback to the presenters.

Lectures (2) BIOC 8012, course director: Jeff Smith

Spring 2018 (3 hours)

“Transcription Factors”

My instruction in the Chromatin Course focused on basic principles of transcription factors, including their roles in development and their mechanistic properties. The lecture introduced the students to the importance of transcription factors, experimental methodologies that were used to discover their properties, and genomics methods that interrogate their roles in disease. A relevant journal article was assigned and we discussed this in depth during the second meeting.

Course Director BIOC 8150

Fall 2018 (22 hours)

Every week all BIMS BMG students meet to listen to either two seminars from other students or a single research seminar. All students are required to present their research once a year. Students are encouraged to engage with the speaker through questions and all students provide feedback for the presenting students. These seminars also expose trainees to a diversity of scientific topics and presentation styles.

Director CMB training grant data club, CMB TG PI: Todd Stukenberg

2017/18 (15 hours)

Every month current and past appointees to the CMB training grant meet and two trainees present their latest research. Students meet with a faculty advisor outside their field to prepare the presentations, with an emphasis on communicating their research to scientists from diverse academic backgrounds. My role as the director of the data clubs is to facilitate discussion amongst the students and provide thoughtful and critical feedback to the presenters.

Lecture, PHS 5705, course director: Steve Rich

Spring 2017 (2 hours)

“The Transcriptome: a biological perspective”

The lecture included an overview of various genomic technologies used to measure transcription and chromatin structure. I also provided examples of how these methods have been used to inform on basic

biological processes, such as development and disease biology. I developed a final exam question for the students that incorporates principles of the lecture.

Medical Biochemistry: Steroid Biosynthesis

Fall 2017 (2 hours)

1.5 contact hours presenting fundamentals of steroid biosynthesis and leading active learning discussion among students.

Medical Biochemistry: Alcohol Metabolism

Fall 2017 (2 hours)

1.5 contact hours presenting fundamentals of alcohol metabolism and leading active learning discussion among students.

Course Director BIOC 8150

Fall 2017 (22 hours)

Every week all BIMS BMG students meet to listen to either two seminars from other students or a single research seminar. All students are required to present their research once a year. Students are encouraged to engage with the speaker through questions and all students provide feedback for the presenting students. These seminars also expose trainees to a diversity of scientific topics and presentation styles.

Lecture BME 4806/7806, course director Brent French

Fall 2017 (1 hour)

“Dissecting Transcription Regulatory Networks using Molecular Genomics”

I designed this lecture for biomedical engineering students, so I placed emphasis on quantitative methods in genomics and recent genomic technologies.

Director CMB training grant data club, CMB TG PI: Todd Stukenberg

2016/17 (15 hours)

Every month current and past appointees to the CMB training grant meet and two trainees present their latest research. Students meet with a faculty advisor outside their field to prepare the presentations, with an emphasis on communicating their research to scientists from diverse academic backgrounds. My role as the director of the data clubs is to facilitate discussion amongst the students and provide thoughtful and critical feedback to the presenters.

Lectures (2) BIOC 8012, course director: Jeff Smith

Spring 2016 (3 hours)

“Transcription Factors”

My instruction in the Chromatin Course focused on basic principles of transcription factors, including their roles in development and their mechanistic properties. The lecture introduced the students to the importance of transcription factors, experimental methodologies that were used to discover their properties, and genomics methods that interrogate their roles in disease. A relevant journal article was assigned and we discussed this in depth during the second meeting.

Lecture BME 4806/7806, course director: Brent French

Fall 2015 (1 hour)

“Dissecting Transcription Regulatory Networks using Molecular Genomics”

I designed this lecture for biomedical engineering students, so I placed emphasis on quantitative methods in genomics and recent genomic technologies.

Educational Scholarship / Creation of Enduring Educational Materials

In order to facilitate genomics research at UVA, I developed step-by-step analysis vignettes to analyze RNA-seq, ChIP-seq, ATAC-seq, and PRO-seq data. I make these resources publicly available and I routinely

direct UVA students to these documents. These vignettes are comprehensive, but I offer follow up with students as needed.

I developed four comprehensive analysis vignettes to analyze molecular genomics data: 1) Computational analysis of ChIP-seq and RNA-seq data; 2) Analysis of PRO-seq data; 3) Analysis of RNA-seq data; and 4) Analysis of ATAC-seq data. Together, the preparation of these documents represent hundreds of hours of my investment. These vignettes have been used extensively by graduate students across UVA and UCHC as they generate data and develop their projects. Each vignette is a step-by-step procedure for analyzing data. These guides contain the code and rationale for each analysis so the user can adapt the principles to their system and start analyzing their own data.

The following are static links to the online documents:

- 1) http://guertinlab.org/wp-content/uploads/2019/09/Genomic_ChIP_RNA-seq_analysis.pdf
- 2) http://guertinlab.org/wp-content/uploads/2019/09/Genomic_PRO-seq_analysis.pdf
- 3) https://github.com/stefbekir/bioc8145/raw/master/Guertin_week4/vignette.pdf
- 4) http://guertinlab.org/wp-content/uploads/2019/09/Genomic_ATAC-seq_analysis_190912.pdf

All MEDS5420 material is available: <https://github.com/guertinlab/meds5420>

Additionally, I provide all 2023 recordings and vignettes:

http://guertinlab.cam.uchc.edu/meds5420_2023/MEDS5420_2023_landing.html

Educational Administration and Leadership

UConn Health

MD/PhD Steering Committee	2022 - current
MD/PhD student F30 writing mentor	2022 - current
BMS Admissions Committee (Systems Biology Area of Concentration)	2021 - current

UVA

BIMS admission committee	2018-2019
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I reviewed over 100 applications and interviewed students for admission into the BIMS program.

Summer Research Internship Program (SRIP) committee	2018-2021
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I reviewed applications and interviewed students for admission into the SRIP program.

Mentorship and Guidance

I believe it is important to acknowledge a “denominator” when mentioning PhD trainees. For example, mentoring 20 successful PhDs is less impressive if an additional 30 prospective PhD students joined the lab and subsequently dropped out of the program. *Every prospective PhD who joined my group has graduated with a PhD or is currently in the lab and successfully working toward a PhD (6/6).*

Trainees

Graduate Students

Jinhong Dong, UCHC MD/PhD Systems Biology program (2022 – current)
Rudradeep Mukherjee, UCHC PhD Systems Biology program (2022 – current)
Siyu Sun, UCHC PhD Systems Biology program (2022 – current)
Jacob Wolpe, UVA Cell Biology PhD program (2020 – 2023)

Thomas Scott, UVA MSTP program (2019 – current)
Arun Dutta, UVA MSTP program (2018 – 2023)
Anna Cetnarowska, Visiting Fulbright Student Masters program (2019 – 2020)

Postdoctoral and beyond

Piotr Przanowski (2019 – 2021)
Sathyan Kizhakke Mattada (2017 – current) DoD Visionary Postdoctoral Fellow
Brian McKenna (2018 – 2019) F32 Ruth L. Kirschstein Fellow
Warren Anderson (2016 – 2018) AHA Fellow
Ninad Walavalkar (2015 – 2018)
Fureya Liu (2015 – 2017) Juvenile Diabetes Research Foundation Fellow

Undergraduate Researchers

Bao Ngyuen (UVA, 2019 – 2021)
Ashley Ewing (UVA, 2018)
Nancy Lee (UVA, 2015 – 2018) Harrison Award fellow
May Saito (UVA, 2016)
Tracy Dien (UVA, 2016)
Sumeet Sharma (Cornell University, Spring 2008 – Summer 2012)
Shifang Wang (Cornell University, Fall 2007 – Fall 2008)

Committee member

Sharon Yaqoob-Krysztofiak (Dr. Andrew Arnold's lab—current)
Mian Horvath (Dr. Julia Oh's lab—current)
Ruoyu Yang (Dr. Julia Oh's lab—current)
Jonathan Batchelder (Dr. Wendy Mok's lab—current)
Kelly Brewer (graduated from Dr. Andrew Arnold's lab August 2022)

UVA

Elisa Enriquez Hesles (graduated from Dr. Jeff Smith's lab January 2023)
Jason Smith (graduated from Dr. Nathan Sheffield's lab April 2022)
Róża Przanowska (graduated from Dr. Anindya Dutta's lab June 2021)
Cassie Robertson (graduated from Dr. Stephen Rich's lab September 2021)
Annie Carlton (graduated from Dr. John Bushweller's lab May 2018)

External committee member

Colin Waters, Harvard College	2018
Emily Kaye, Brown University	2017

Student Awards

Arun Dutta: Best Graduate Student Poster	2019
Penn State 38 th Summer Symposium in Molecular Biology: Chromatin and Epigenetic Regulation of Transcription	
Arun Dutta: Biomedical Data Sciences Training Grant awardee	2019-2022
Tommy Scott: Cell and Molecular Biology Training Grant awardee	2019-2021
Jacob Wolpe: Bureau of Indian Education Scholarship	2021-2022

