**EDUCATION**

**University of California,** Berkeley, CA **August 2019-Present**

Ph.D. Chemical and Biomolecular Engineering GPA: 3.96/4.00

Designated Emphasis in Computational and Genomic Biology

**University of Michigan**,Ann Arbor, MI **September 2015-April 2019**

B.S.E. Chemical Engineering, *Summa Cum Laude*  GPA: 3.87/4.00

**AWARDS AND HONORS**

Individual

* INSPIRE Symposium Awardee. Washington University School of Medicine ([2023](https://neuroscience.wustl.edu/opportunities/inspire-interdisciplinary-neuroscience-seminars-by-phd-students-to-incentivize-research-exchange/))
* NIH Outstanding Scholars in Neuroscience Award ([2022](https://wwwapps.nimh.nih.gov/str/displayOsnapHome.action))
* Society for Neuroscience Trainee Professional Development Award ([2022](https://www.sfn.org/meetings/meeting-awards/trainee-professional-development-award))
* Best Talk Award at the 2021 Computational Biology Retreat. UC Berkeley (2021)
* NSF Graduate Research Fellowship ([2019](https://www.nsfgrfp.org/))
* 1st place, ChE UG Research Poster Competition. Ann Arbor, MI (2019)
* Sinnott Prize, Outstanding ChE Senior for academics and leadership. Ann Arbor, MI ([2019](https://che.engin.umich.edu/undergraduate/student-resources/scholarships/))
* 1st place, Oral Presentation in Biomaterials. GCURS. Houston, TX (2018)
* 2nd place, AIChE Undergraduate Poster Competition. Pittsburgh, PA (2018)
* Facilitator of the Year, Organic Chemistry II, Science Learning Center. Ann Arbor, MI (2018) ([Student testimonials](https://drive.google.com/file/d/1Fna2rC_qYl2piB3H8d-LZt9K_Wyrk_fi/view?usp=sharing))
* 2nd Place,EBICS Conference Poster Competition. Atlanta, GA (2017)
* 1st place, UROP Summer Symposium Poster Competition. Ann Arbor, MI (2016)

Team

* 1st Place Award, The Landes Contest in Technical Communication, Best ChE 488/489 Final Report, Poster, and Presentation. Ann Arbor, MI ([2019](https://techcom.engin.umich.edu/landes/))
* 1st Place Award, Best All-Around ChE 342 Project. Ann Arbor, MI (2018)
* 1st Place Award, Best All-Around ChE 230 Project. Ann Arbor, MI (2016)

**EXPERIENCE**

**Genentech Research and Early Development (gRED) May-August 2022**

*Data Science and Statistical Computing Intern*

* Developed unsupervised and supervised machine learning approaches to analyze high-dimensional genomics datasets and discover therapeutic targets for neurodegenerative diseases

**University of California, Berkeley|Shekhar Lab October 2019-Present**

*Graduate Student Researcher*

* Developing machine learning models and leveraging single-cell genomics data to explore the molecular underpinnings of cellular diversity in the visual cortex
  + Undergraduate mentees: Srikant Sagireddy, Jason Hou, Xiaoqi Sun

**University of California, Berkeley|Landry Lab May-August 2018**

*Amgen Scholar*

* Conceived and executed a project to systematically probe the influence of gold nanoparticle physicochemical properties on bio-cargo loading efficiency
* Developed two separate nanoplatforms for the delivery of siRNA and pDNA to intact leaves

**Massachusetts Institute of Technology|Hammond Lab June-August 2017** *EBICS REU Intern*

* Synthesized and characterized a library of polymers to identify candidates with maximum uptake to cytotoxicity ratios in cartilage for applications in osteoarthritis drug delivery
* Elucidated relationships between the physicochemical properties of polymers and their transport properties and toxicity in cartilage.

**University of Michigan Biointerfaces Institute|Lahann Lab September 2016-Ocrober 2018**

*Undergraduate Researcher*

* Harnessed nanoindentation to probe the interfacial properties that govern how synthetic polymer brushes support human embryonic stem cells (hESCs)
* Through a statistical DOE, developed a relationship between bulk and nanomechanical properties that explained the behavior of hESCs on polymer brush surfaces

**SELECTED PUBLICATIONS** (\*equal contribution)

1. **Butrus, S**., Hou, J., Sagireddy, S., Shekhar, K*.* A decision tree-based graph on single-cell sequencing data. *Under preparation.*
2. **Butrus, S**., Sagireddy, S., Shekhar, K. Defining selective neuronal resilience and identifying targets of neuroprotection and axon regeneration using single-cell RNA sequencing – computational approaches. *Methods in Molecular Biology* (2023)*. In press.*
3. \*Whitney, I., \***Butrus, S**., Sanes, J.R., Shekhar, K. Vision-dependent and -independent molecular maturation of mouse retinal ganglion cells. *European Journal of Neuroscience* (2022). *In press*.
4. Shekhar, K., Whitney, I., **Butrus, S**., Peng, Y., Sanes, J.R. Diversification of multipotential postmitotic mouse retinal ganglion cell precursors into discrete types. *eLife* (2022) 11; e73809.
5. \*Cheng, S., \***Butrus, S**., \*Tan, L., Sagireddy, S., Trachtenberg, J.T., Shekhar, K., Zipursky, L. Vision-dependent specification of cell types and function in the developing cortex. *Cell* (2022) 185, 2: pp. 311-327.

* Highlighted in [*Nature*](https://www.nature.com/articles/d41586-022-00463-2)by Puiggros and Jabaudon (2022).
* Highlighted in *UC Berkeley,* [*College of Chemistry Press Release*](https://chemistry.berkeley.edu/news/research-shines-light-development-visual-cortex-during-critical-period-after-birth) (2022).
* Highlighted in [*EurekAlert*](https://www.eurekalert.org/news-releases/941779) (2022).

1. Zhang, H.\* Goh, N.S.\*, Wang, J., Demirer, G.S., **Butrus, S**., Park, S-J, Landry, M.P. Nanoparticle Cellular Internalization is Not Required for RNA Delivery to Mature Plant Leaves. *Nature Nanotechnology* (2021)
2. Kölsch, Y., Hahn, J., Sappington, A., Stemmer, M., Fernandes, A.M., Helmbrecht, T.O., Lele, S., **Butrus, S.,** Laurell, E., Arnold, I., Shekhar, K., Sanes, J.R., Baier, H. Molecular classification of zebrafish retinal ganglion cells links genes to cell types to behavior. *Neuron* (2020) 109, 4: pp. 645-662.
3. **Butrus, S.**, Greenman, K., Kopyeva, I., Khera, Eshita., Nishii, A. An Undergraduate-Led, Research-Based Course that Complements a Traditional Chemical Engineering Curriculum. *Chemical Engineering Education* (2020) 54, 2; pp. 97-106.
4. Wang, J.W., Grandio, E.G., Newkirk, G.M., Demirer, G.S., **Butrus, S.**, Giraldo, J.P., Landry, M.P. Nanoparticle-mediated genetic engineering of plants. *Molecular Plant* (2019) 12; pp. 1037-1040.

**SELECTED PRESENTATIONS**

1. \***Butrus, S**., \*Cheng, S., \*Tan, L., Sagireddy, S., Trachtenberg, J.T., Shekhar, K., Zipursky, L. *Vision-dependent specification of cell types and function in the developing cortex.* Visual System Development GRS/GRC. Southbridge, MA (2022).
2. **Butrus, S.,** Shekhar, K. *Vision mediates molecular patterning in the developing visual cortex*. UC Berkeley Center for Computational Biology Retreat (2021).
3. **Butrus, S.,** Shekhar, K. *Single-Cell Transcriptional Dynamics of Retinal Ganglion Cell Diversification*. 2020 AIChE Meeting.
4. **Butrus, S.**, Demirer, G., Goh, N., Zhang, H., Cunningham, F., Landry, M. *Development and Characterization of Gold Nanoparticles for Plant Genetic Engineering*

* **Oral:** UC Berkeley Amgen Scholars Program Symposium, Berkeley, CA (2018); ABRCMS Annual Meeting, Indianapolis, IN (2018); GCURS Rice University, Houston, TX (2018)
* **Poster:** UC Berkeley Amgen Scholars Program Symposium, Berkeley, CA (2018); BMES Annual Meeting, Atlanta, GA (2018); AIChE Annual Meeting, Pittsburgh, PA (2018)

1. **Butrus, S.**, Geiger, B., Grodzinsky, A.J., Hammond, P.T., *Tuning Size and Charge of a Multivalent Polymer Library for Enhanced Drug Delivery to Cartilage*

* **Oral:** AIChE Annual Conference, Minneapolis, MN (2017)
* **Poster**: MIT Summer Research Programs Annual Poster Session, Cambridge, MA (2017); EBICS Annual Conference, Atlanta, GA (2017); BMES Annual Conference, Phoenix, AZ (2017); NanoDDS Annual Meeting, Ann Arbor, MI (2017)

**TEACHING EXPERIENCE**

**Berkeley Bioinformatics Bootcamp |** *Lecturer and TA* **January 2022-Present**

* Lead Python programming sessions on introductory bioinformatics concepts

**InspiritAI |** *AI Scholars Instructor* **December 2021-Present**

* Immerse high school students in Artificial Intelligence through lectures, assignments, and projects

**UC Berkeley Chemical and Biomolecular Engineering Department |** *Graduate Student Instructor*

*ChemEng 142: Chemical Kinetics and Reaction Engineering* **August 2019-December 2019**

*ChemEng 150A: Transport Processes* (4.7/5 rating, 93 students, [testimonials](https://drive.google.com/file/d/11T_wvYR0oEVntdqseUIcO3IAa-xVgI8N/view?usp=sharing)) **January 2021-May 2021**

* Prepared and taught weekly discussion sessions to support student understanding of course material
* Developed homework solutions, held weekly office hours, and proctored and graded exams

**University of Michigan Chemical Engineering Department |** *Teaching Assistant*

*ChE 496: Introduction to Experimental and Computational Research in ChE* **March 2018-May 2019**

* Assembled a group of 10 undergraduate and graduate peers in collaboration with faculty members and researchers to design a research-focused course in our ChemE department
  + Guided efforts in organizing meetings, developing content, and securing resources and instructors; Secured a $15,000 departmental grant to support course launch
* Led the conceptualization and ultimate realization of course objectives and structure
* Led the design and organization of laboratory and lecture assignments
* Developed and tested laboratory modules, held weekly office hours, and graded assignments

*ChE 344: Reactor Design and Engineering* **September 2018-May 2019**

* Prepared and taught weekly review sessions to improve student understanding of course material
* Developed homework solutions, held weekly office hours, and proctored and graded exams

**University of Michigan Science Learning Center January 2017-May 2019**

*Organic Chemistry II Course Leader*

*Organic Chemistry II Study Group Facilitator* (4.9/5 rating, 86 students, [testimonials](https://drive.google.com/file/d/1Fna2rC_qYl2piB3H8d-LZt9K_Wyrk_fi/view))

* Held weekly sessions supplementing lecture by reinforcing and reviewing course concepts
* Led collaborative course meetings to provide resources, support, and mentorship for study group facilitators
* Developed and presented topic workshops and designed study materials for facilitators’ use

**SERVICE EXPERIENCE**

**College of Chemistry Transfer Student Mentorship Program |** *Mentor* **August 2022-Present**

* Meet monthly with transfer student mentees to support their academic transition to UC Berkeley
* Assist students with acquiring research and internship opportunities by advising them on resumé building and applying to positions

**College of Chemistry Undergraduate Research Incubator** | *Supervisor* **September 2021-May 2022**

* Mentored undergraduate students seeking an independent research experience
* Supervised experiments carried out by students and maintained the safety and cleanliness of the laboratory working environment

**Be A Scientist!** and **GOLD Science Fair |** *Mentor*  **January 2021-May 2022**

* Support and mentor middle school and high school students on the design, execution, and communication of science projects

**Undergraduate Research Symposium Committee |** *Founder* **November 2018-May 2019**

* Assembled a team of 8 undergraduate peers to organize the first campus-wide undergraduate research symposium at the University of Michigan
* Fundraised over $12,000 from 16 entities on campus to support an event of 150 presenters and 100 judges

**Camp Kesem |** *Camp Counselor and Unit Leader* **July 2016-August 2019**

* Fundraised $500 annually to send children whose families are affected by cancer to a free, one-week summer camp; maintained the health and well-being of several children and counselors throughout a week of camp activities

**ChemE Undergraduate Program Committee |** *Member* **October 2017-May 2019**

* Discussed and voted on improvements to the ChemE program and funding requests for students and organizations

**University of Michigan Student Life Housing August 2017-May 2018**

*Residential Advisor, First Generation Student Theme Community*

* Designed weekly social and educational activities to foster an inclusive and cohesive community of residents; advised residents on academic, personal, and professional matters

**SKILLS**

**Software:** Python | R | COMOSL | ASPEN Plus

**Research Areas:** Cloud computing | management of large datasets (>1M samples) | supervised and unsupervised machine learning | time-series analysis | pattern recognition | NLP | data visualization | computer vision | deep learning | generative models | neural networks

**MISCELLANEOUS**

**Languages:** English (fluent) | Arabic (fluent) | Chaldean (fluent) | Spanish (intermediate)

**Hobbies:** Cycling | Piano | Soccer| Running | Hiking | Camping | Skiing | Ultimate Frisbee | Basketball