

Galen Vincent

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EDUCATION

Colorado School of Mines, Golden, CO Master of Science in Statistics	Anticipated May 2020 GPA: 4.0/4.0
Colorado School of Mines, Golden, CO Bachelor of Science in Engineering Physics Minor in Computational and Applied Mathematics	May 2019 GPA: 4.0/4.0

TECHNICAL SKILLS

Programming Languages: R, MATLAB, Mathematica; Some SQL, Python, C++, Slurm.

Software: LaTeX, SolidWorks; Some OpticStudio.

Other: Parallel and high-performance computing, spatial point patterns, spatial statistics, technical report writing and presentations, relational databases, circuit design, machine shop, 3D printing, welding.

RESEARCH EXPERIENCE

Zimmerman Research Group – Colorado School of Mines – Golden, CO Dec 2017 – Present
Undergraduate/Graduate Researcher, Spatial Statistics for Atom Probe Tomography

- Characterize and quantify different material morphology by applying spatial statistics to 3D point clouds of molecule/atom positions from atom probe tomography.
- Trained a machine learning regression model based on Ripley's K-function to characterize 3D point pattern clustering using R and simulations run on high performance computer system.
- Preparing manuscript for publication in peer-reviewed journal on characterizing clusters using spatial statistics.

Hammerling Research Group – Colorado School of Mines – Golden, CO Aug 2019 – Present
Graduate Researcher, Improving the Consistency Test for the Community Earth System Model (CESM)

- Analyze behavior of different covariance matrix eigenvalue/eigenvector estimators under varying sample sizes and covariance matrix structures using simulations in R.
- Apply improved estimators to increase accuracy and reproducibility of principal component analysis used by CESM developers to detect statistically significant changes to model output.
- Preparing manuscript for publication in peer-reviewed journal on use of better covariance matrix estimators to improve CESM error detection.

National Institute of Standards and Technology – Gaithersburg, MD Summer 2018
Summer Undergraduate Research Fellow (SURF), Model Guided Flexible Transistor Fabrication

- Built a multivariate model for transistor performance as a function of fabrication conditions using MATLAB and used it to find fabrication conditions which optimize transistor performance.
- Developed a suite of MATLAB functions to standardize data analysis and calculation of basic transistor properties like mobility from raw measured data.
- Fabricated dozens of organic transistors using spin and blade coating techniques, measured current-voltage curves for each, and quantified overall performance of each with calculated mobility.

Steward Observatory – University of Arizona – Tucson, AZ

Summers 2016, 2017

Research Assistant, Concentrating Photovoltaics (CPV) Tracker Development

- Used SolidWorks, MATLAB, and OpticStudio to design optics for a prototype CPV sun tracker that was eventually built, tested, and had results presented at an international CPV conference.
- Worked with machine shop technicians to ensure successful fabrication of tracker components.
- Contributed designs, models, and sketches to patent written by mentor.

Engineering Physics Field Session – Colorado School of Mines – Golden, CO

Summer 2017

Laboratory Student in Lasers/Optics, Vacuums, Machine Shop, and 3D Printing

- Built a functional thermometer using a laser interferometer and an aluminum rod by taking advantage of the thermal expansion properties of aluminum.
- Used a turbo molecular pump and vapor deposition system to deposit silver and copper thin films onto the sides of a Rubik's Cube.
- Operated a variety of machine shop apparatuses including CNC and manual lathes, CNC and manual mills, and a TIG welder to manufacture a functioning Newton's cradle from raw aluminum.

TEACHING EXPERIENCE

Physics Department – Colorado School of Mines – Golden, CO

Spring 2019, Fall 2020

Studio Instructor, Physics 100 - Mechanics

- Give short lectures, help students work through problems and perform experiments, and help develop course content in weekly pre-class instructor meetings.
- Instruct approximately 225 undergraduates split between two sections; directly supervise 11 undergraduate teaching assistants.

Alameda International High School – Lakewood, CO

Spring 2018

Teaching Assistant/NOYCE Intern, Algebra II/Trigonometry and Honors Physics

- Taught 6 hours per week in high school math and physics classrooms; graded assignments, worked with students in class, and occasionally gave lectures.
- Discussed experiences and techniques in teaching with education professionals in weekly seminar.

AWARDS AND HONORS

Outstanding Graduating Senior in Engineering Physics (2019) - Awarded by the physics faculty at Colorado School of Mines to a single graduating senior in recognition of undergraduate academic work and research.

Ryan Sayers Memorial Award and Scholarship (2019) – Awarded by the applied math/statistics and physics faculty at Colorado School of Mines for academic excellence and creativity in undergraduate research.

RELEVANT COURSE PROJECTS

Spatial Statistics (MATH 532) Final Projects

Fall 2018

- Analyzed spatial correlation of school performance in Colorado using classical geostatistical methods.
- Applied kriging in R to predict school performance using results from the above analysis.

Mathematical Physics (PHGN 311) Semester Projects

Fall 2017

- Used Mathematica to organize and perform comprehensive statistical analyses of scalar data (music volume), vector data (temperature in Colorado over time), and matrix data (image analysis).

OTHER ACTIVITIES

Men's Club Soccer Treasurer - Colorado School of Mines

Jan 2017 – May 2018

- Fundraised over \$10,000 in one season to finance team travel, equipment, and league fees.
- Developed professional relationships with the club sports director and club sports council.