Michael (Mike) Stanley

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EDUCATION

- **Carnegie Mellon University** — Pittsburgh, PA
  PhD - Statistics and Data Science — *Aug 2019 - May 2024*

- **Carnegie Mellon University** — Pittsburgh, PA
  Masters of Science - Statistics — *Aug 2015 - May 2016*

- **Baylor University** — Waco, TX
  B.S. - Mathematics, Minor - French: GPA: 3.99/4.00 — *May 2015*

RESEARCH AND PROFESSIONAL EXPERIENCE

- **Carnegie Mellon University** — Pittsburgh, PA
  Researcher advised by Mikael Kuusela — *Aug 2019 - Present*

  - **Confidence intervals for ill-posed inverse problems via convex optimization**: Developed a novel statistical framework for optimization-based confidence intervals for inverse problems with parameter constraints by designing and implementing numerical experiments and leveraging convex optimization theory to characterize statistical properties. This work solved a biased uncertainty quantification problem in particle physics (lead author on JINST paper) and is detailed in a pre-print with an additional manuscript forthcoming.

  - **Uncertainty Quantification (UQ) for Carbon Flux Inversion**: Researched, designed, and implemented (in Python) two first-order high-dimensional optimization algorithms to compute regional carbon flux confidence intervals such that the statistical likelihood and jacobian are implicitly defined through a supercomputer-based simulator (in Fortran). The resulting intervals were delivered to scientific collaborators at the Jet Propulsion Laboratory to compare against their flux uncertainty quantification. Lead author on a pre-print analyzing and extending our collaborators' current Monte Carlo UQ method with an additional pre-print forthcoming.

- **Jet Propulsion Laboratory (JPL)** — Remote
  Intern with the Machine Learning and Instrument Automation Group — *Jun 2020 - Aug 2020*

  - **Algorithm development for Decision Theoretic Uncertainty Quantification (DTUQ)**: Researched and implemented gradient-free optimization methods for DTUQ, resulting in co-authorship on a Journal of Computational Physics paper. Was responsible for substantial development of the accompanying codebase.

- **tellic (startup)** — New York, NY
  Senior Data Scientist — *May 2016 - Jun 2019*

  - **General Data Science/Machine Learning at tech startup**: As the first team member, I helped recruit a diverse group of over a dozen professionals, ranging from senior to junior roles, while also driving the implementation of cutting-edge ML systems in text classification and entity recognition using Python, spaCy, sklearn, and GCP. These efforts led to co-authoring a patent and securing a multi-million dollar contract with a top-10 pharmaceutical company.

TECHNICAL SKILLS SUMMARY

- **Computing**: Convex optimization and Monte Carlo sampling on large-scale computing systems (leveraging PBS)
- **Modeling**: Standard ML algorithms, classical statistical models, inverse modeling
- **Programming**: Python (highly experienced), SQL/Bash/PBS (proficient), R/Fortran (working knowledge)

MENTORSHIP AND TEACHING

- **Teaching Assistant** — Fall 2019 - Present

  - Led four courses as Head TA (plus four others), overseeing a team of six TAs. Conducted weekly one-hour recitations for 100 students in two courses and held bi-weekly hour long office hours, providing individual support, group problem-solving, and code debugging. Managed the grading of numerous student homework submissions and developed a Python script to streamline remote quiz response collection during the COVID pandemic.

- **Data Science Summer Camp Lead Instructor** — Summer 2022

  - Created and delivered ten 1.5-hour lectures to a class of 10 students, covering data science, statistics, and ML principles. Designed five 1-hour coding activities to teach basic regression concepts and statistical programming in R.

- **Corporate Capstone Advisor** — Fall 2019

  - Guided four senior undergraduates in a semester-long project with Principal Finance Group, focusing on forecasting fixed-income market conditions. Conducted bi-weekly meetings to collaborate with the business, develop action plans, and provide expertise in statistics, coding, and professional interactions with company stakeholders.

Grants and Selected Presentations

- **JPL Strategic University Research Partnership (SURP)**   Sep 2021 - Sep 2024
  - Awarded yearly funding to develop and implement decision theoretic and optimization-based UQ for JPL applications, including remote sensing, carbon flux inversion, and glacier modeling. This partnership strategically provides JPL with a powerful UQ alternative to Bayesian approaches for when priors are difficult to justify.

- **Systematics in Particle Physics Data Analysis**   Apr 2023
  - Invited to a workshop to deliver a talk titled, "Accounting for systematic uncertainties in unfolding UQ."

- **SIAM Computational Science and Engineering (CSE)**   Feb 2023
  - Co-organized a minisymposium on Robust Uncertainty Quantification and gave a talk titled, "Optimization-based Confidence Interval Construction for Ill-Posed Inverse Problems."

- **SIAM Uncertainty Quantification (UQ)**   Apr 2022
  - Delivered a session talk titled, "Optimizing Confidence Intervals for Satellite-Based Carbon Flux Inversion."

- **Joint Statistical Meetings (JSM)**   Aug 2021
  - Delivered a topic-contributed session talk titled, "Statistical issues in UQ for satellite-based carbon flux inversion."