

# Antony Sikorski

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## EDUCATION

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<b>PhD, MS — Colorado School of Mines (CSM)</b>	2022 - Present
Statistics PhD Candidate	
Data Science MS awarded May 2024	
<b>Advisors:</b> <a href="#">Douglas Nychka</a> , <a href="#">Daniel McKenzie</a>	
<b>Research Focus:</b> Combining machine learning and spatial statistics to create fast, accurate, and interpretable methods for big datasets.	
<b>BS — University of California, San Diego (UCSD)</b>	2018 - 2021
Major in Applied Mathematics, Minor in Physics	

## AWARDS

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— <b>NSF GRFP</b>	Sept 2024
Awarded the National Science Foundation Graduate Research Fellowship in the second year of my PhD.	

## WORK EXPERIENCE

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— <b>Meta Reality Labs – Data Scientist Intern</b>	May 2025 - Aug 2025
– Formulated custom convex optimization procedures for Reality Labs with cvxpy and pyomo in Python.	
– Developed and implemented a suite of deep learning and time series forecasting models.	
– Leveraged geospatial data to build custom tooling to aid leadership in key decisions.	
— <b>NASA Jet Propulsion Laboratory Machine Learning Intern</b>	May 2023 - Aug 2023
– Developed an unsupervised anomaly detection system using adversarially trained auto-encoders to identify communication failure modes between spacecraft and the Deep Space Network (DSN) antenna fleet in multivariate time series data.	
– Designed custom parsers and automated several previously manual data acquisition pipelines, leveraging LLMs to rapidly process the results. Routines that once occupied hours of engineers' time now occur in seconds.	
— <b>Excelitas Technologies Data Consultant</b>	Feb 2022 - Mar 2023 Aug 2022 - Mar 2023
– Continued to support data engineering and analysis projects for the improvement of the Excelitas data layer.	
<b>Data Analytics Engineer</b>	Feb 2022 - Aug 2022

- Identified critical to quality factors and worked with Process and Sustaining engineering teams to drive manufacturing improvements.
  - Engineered measurement database to encapsulate all necessary BOM structure measurements.
  - Automated the query of data to allow for statistical process control and process capability analysis.
- **Tutors and Friends** Jun 2020 - Feb 2022  
**Academic Tutor**
- Tutored mathematics, physics, ACT, and SAT for all ages, with a focus on high school students and undergraduates.

## RESEARCH EXPERIENCE

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- **Predictive Models for Large Spatial Data (Thesis Projects)** Aug 2022 - Present  
*Colorado School of Mines* Advisors: *Douglas Nychka, Daniel McKenzie*
  - **Project 1:** Sped up the normalization of basis functions for fast Gaussian Process approximations. Two fast algorithms implemented in the [LatticeKrig R package](#).
  - **Project 2:** Created the [LatticeVision](#) framework, in which image-to-image neural networks—both U-Net and transformer-based—are used for non-stationary parameter estimation on large spatial datasets.
- **LEAP Momentum Fellowship** May 2024 - Aug 2024 (Present)  
*Columbia University, NYU Courant* Advisor: *Sara Shamekh*
  - Supervised the research of two undergraduate students, resulting in their first conference presentation.
  - Used deep learning and equation discovery methods to create interpretable parametrizations of vertical turbulent fluxes in the atmosphere. These advances improve the accuracy of long term climate model predictions.
  - Led introductory workshops on data visualization, Jupyter notebooks, deep learning with PyTorch, and version control.
- **Classification of Political Entity Relationships** Jun 2021 - Feb 2022  
*University of California, San Diego* Advisor: *David Meyer*

Focused on quantifying and classifying relationships between countries using data from the ICEWS dataset with the aim of applying structural balance theory to predict changes in power dynamic.
- **Synthesis of Strongly Correlated Quantum Materials** Jan 2019 - Nov 2019  
*University of California, San Diego* Advisor: *Brian Maple*

Used tetra-arcing and Optical Floating zone growths to synthesize superconductors and other strongly correlated quantum material in an attempt to find higher temperature superconductors.
- **Searching for Quantum Spin Liquids** Jun 2016 - Sept 2019  
*Colorado State University, Fort Collins* Advisor: *Kathryn Ross*

Synthesized single crystals of strongly correlated materials in an attempt to study the

exciting quantum spin liquid state. Used an Optical Floating Zone to grow crystals of Ytterbium Silicate and analyzed the structure through neutron scattering.

## TEACHING EXPERIENCE

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- **Introductory Statistics (Math 201)** Jan 2024 - May 2024  
*Colorado School of Mines*  
Taught the introductory undergraduate statistics course covering hypothesis testing, confidence intervals, regression, and general data analysis and wrangling proficiency in R.
- **Differential Equations (Math 225)** Aug 2022 - May 2023  
*Colorado School of Mines*  
Led recitations for two semesters and graded as a TA for the undergraduate differential equations course.

## TECHNICAL SKILLS

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- **Python:** Generally used for machine learning and data analysis. Notable proficiencies outside classic libraries: PyTorch, TensorFlow, Keras, PySR, Scikit-learn, Pandas, Jupyter Notebooks
- **R:** Used for data analysis and statistical modeling. Currently developing an update for significant computational efficiency in *LatticeKrig* package for large spatial data. Notable packages: fields, LatticeKrig, dpylr, ggplot2, RMarkdown
- **SQL:** Used for querying large datasets: PostgreSQL, Presto, Spark
- **typesetting:** proficient with L<sup>A</sup>T<sub>E</sub>X and Markdown
- **Other** Proficiency in Git, CI/CD, Julia, Matlab, CI/CD.
- **Human Languages:** English (fluent), Ukrainian (beginner), Russian (fluent), Spanish (beginner)

## PUBLICATIONS

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- “LatticeVision: Image to Image Networks for Modeling Non-Stationary Spatial Data”, **A. Sikorski**, M. Ivanitskiy, N. Lenssen, D. Nychka, D. McKenzie, *International Conference on Artificial Intelligence and Statistics (AISTATS)* (2026)
- “Normalizing Basis Functions: Approximate Stationary Models for Large Spatial Data” **A. Sikorski**, D. McKenzie, D. Nychka, *Stat* (2024)
- “Crystal Growth of Quantum Magnets in the Rare-Earth Pyrosilicate Family  $R_2Si_2O_7$ , ( $R = Yb, Er$ ) Using the Optical Floating Zone Method” H. S. Nair, T. DeLazzer, T. Reeder, **A. Sikorski**, G. Hester, & K. A. Ross, *Crystals* (2019)

## SOFTWARE DEVELOPMENT

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- *LatticeKrig* (R): Computationally efficient methods for fitting and predicting from large spatial datasets. Available on [CRAN](#).

## TALKS & PRESENTATIONS

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- “Vision Models for Big, Non-Stationary, Spatial Data”. **A. Sikorski**, M. Ivanitskiy, D. McKenzie, D. Nychka
  - Talk at *GRADS (The Graduate Research and Discovery Symposium)* (2025)
  - Talk at *AMS GVD Research Symposium* (2025)
- “Machine Learning for Equation Discovery in Climate Science”, **A. Sikorski**, invited talk at *Mines Optimization and Deep Learning Seminar (MODL)* (2024)
- “Parametrizing Turbulent Fluxes in the Planetary Boundary Layer with Symbolic Regression”, L. Pong, G. VanZetten, **A. Sikorski**, Y. Qu, S. Shamekh, talk at *The New York Climate Exchange* (2024)
- “Basis For Change: Approximate Stationary Models for Large Spatial Data”, **A. Sikorski**, D. McKenzie, and D. Nychka
  - Talk and poster at *Extremes* (2024)
  - Poster at *JSM (Joint Statistical Meeting)* (2024)
  - Talk and poster at *IMSC (International Meeting on Statistical Climatology)* (2024)
  - Poster at *GRADS (The Graduate Research and Discovery Symposium)* (2024)
- “Fast Prediction and Parameter Estimation for Large Spatial Data with Machine Learning” **A. Sikorski**, invited talk at *AMS Graduate Student Colloquium* (2023)
- “Exploring Neural Likelihood Surfaces for Spatial Processes”, **A. Sikorski**, talk at *Mines Optimization and Deep Learning Seminar (MODL)* (2023)
- “Optical Floating Zone Growth of  $\text{Yb}_2\text{Si}_2\text{O}_7$ ”, **A. Sikorski**, H.S. Nair, T. Reeder and K.A. Ross, presented at the *APS Four Corners Conference* (October 2017)

## SERVICE

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- **Undergraduate Students Mentored**
  - Laura Pong (LEAP, 2024)
  - Greta VanZetten (LEAP, 2024)
- **Organization**
  - Session Chair: “Risk Analysis, Management, and Investing” (JSM, 2024)
  - Department Representative: Mines Graduate Student Government (GSG)
- **Software Review**
  - `darkroast` R package (2024)
  - `ZANJ` Python package (2023)
- **Affiliations**
  - NASA Jet Propulsion Laboratory (JPL)
  - Mines Optimization and Deep Learning (MODL)

- Learning the Earth with Artificial Intelligence and Physics (LEAP) NSF Science and Technology Center (STC)
- Society for Women in Mathematics (SWiM)
- American Statistical Association (ASA)