

KRISTOPHER A. PRUITT, PhD

kristopher.pruitt@colorado.edu

Award-winning educator with 15+ years of teaching experience at the undergraduate level. Diverse technical expertise that spans pure and applied mathematics, statistics, data science, operations research, and quantitative economics. Innovative researcher and author of technical publications with over 200 citations. 20-year military veteran dedicated to inspiring future leaders with a focus on the principles of inclusivity and character.

EDUCATION

PhD	Colorado School of Mines, Quantitative Economics GPA: 4.0 Dissertation: A mixed-integer nonlinear program for the optimal design and dispatch of fuel cell-based distributed generation systems. Committee: Dr. Alexandra Newman (chair), Dr. Robert Braun, Dr. Dinesh Mehta	2012
MS	Air Force Institute of Technology, Operations Research GPA: 3.93 Thesis: Modeling homeland security: A value focused thinking approach. Advisor: Dr. Richard Deckro	2003
BS	Purdue University, Mathematics GPA: 3.77	2001

HONORS AND AWARDS

William H. Heiser Award Selected by graduating class as #1 senior faculty member at USAF Academy	2018
William Jesse Coulter Award Selected by faculty as division's #1 graduate student at Colorado School of Mines	2012
Daniel W. Litwhiler Award Selected by faculty as department's #1 course director at USAF Academy	2007
Outstanding New Instructor Award Selected by faculty as department's #1 new instructor at USAF Academy	2005

TEACHING EXPERIENCE

A total of 24 semesters of teaching experience. As director, created course objectives, syllabi, assessments, end-of-course reviews, and mentored faculty. As instructor, planned lessons, delivered in-person and virtual lectures, implemented assessments, and mentored students.

University of Colorado Boulder, Colorado Aug 2022 - present
Associate Teaching Professor, Department of Applied Mathematics

- STAT 2600 – data acquisition, wrangling, graphics, ethics, and analysis (course director)
- STAT 3400 – estimation, inference, linear and logistic regression (course director)
- STAT 4680/5680 – statistical collaboration and project management (course director)

USAF Academy, Colorado May 2019 - Aug 2021
Associate Professor, Department of Mathematical Sciences

- Math 378 – statistical learning, regression, and classification (course director)
- Math 377 – random variables, sampling distributions, inferential statistics (instructor)
- Math 300 – basic probability, summary statistics, basic hypothesis testing (instructor)
- Math 300S – data reasoning, critical thinking, decision-making (course director)
- Math 243 – multivariate differential and integral calculus (instructor)

USAF Academy, Colorado Jan 2014 - May 2018
Assistant Professor, Department of Mathematical Sciences

- OR 311 – deterministic modeling, linear and nonlinear programming (course director)
- OR 310 – survey of operations research methods, systems analysis (instructor)
- OR 405 – senior seminar presenting real-world applications (course director)
- Math 340 – discrete math, logic, set and graph theory, combinatorics (instructor)
- Math 245 – 1st and 2nd order ordinary differential equations (instructor)
- Math 142 – univariate integral calculus (instructor)

USAF Academy, Colorado May 2005 - May 2009
Instructor, Department of Mathematical Sciences

- Math 356 – probability, distributions, inferential statistics (course director)
- OR 312 – stochastic modeling, queuing, simulation, reliability (instructor)
- Math 141 – univariate differential calculus (instructor)

WORK EXPERIENCE

A 20-year military career as an analyst and educator, followed by a transition to industry to gain experience in the field of sports analytics and by a return to data science education.

University of Colorado Boulder, Colorado Aug 2022 - present
Associate Teaching Professor, Statistics and Data Science

- Developing modern curriculum for multiple new data science degree programs
- Founder/mentor for university's first student chapter of American Statistical Association
- Member of Statistics and Data Science Committee guiding undergrad/grad programs
- Senior collaborator with Laboratory for Interdisciplinary Statistical Analyses

FTM Analytics, Remote May 2021 - Aug 2022
Senior Data Analyst, Sports

- Developed game and tournament prediction models for major sports media outlet
- Created automated analytical insights deployed on site with millions of subscribers
- Produced analytical products for football, basketball, baseball, hockey, golf, and tennis
- Authored guidebook on mathematics of sports betting for major online sports book

USAF Academy, Colorado Jun 2019 - May 2021
Senior Data Scientist

- Selected to establish university's first bachelor's degree program in Data Science
- Coordinated across four academic departments to deliver state-of-the-art curriculum
- Secured key research alliances with organizations across academia and industry
- Data Science became Top 10 major in terms of student enrollment in its first year

Headquarters USAF, Pentagon Jun 2018 - Jun 2019
Chief of Analytic Community & Governance

- Selected by Chief Analytic Officer to lead key initiatives during 1-year sabbatical
- Negotiated guaranteed master's degree opportunity for all new Air Force analysts
- Coordinated 3-day technical conference for 1,000-member analytic community

USAF Academy, Colorado Jun 2012 – Jun 2018
Deputy Department Head, Senior Military Faculty

- Led all educational initiatives for the institution's largest academic department
- Supervised 17 courses per semester, delivered by 50 faculty to 2,000+ students
- During 1-year deployment to Afghanistan, led acquisition program valued at \$5B

USAF Academy, Colorado Jun 2005 - Aug 2009
Executive Officer

- Selected as the direct administrative assistant to the Department Head (Chair)
- Coordinated scheduling, awards, and promotions for 50-member department

AF Logistics Management Agency, Alabama Mar 2003 - Jun 2005
Logistics Analyst

- Led analyses of executive-level projects focused on supply and transportation

RESEARCH INTERESTS

Primary areas of research are mathematical modeling and statistical learning with applications to human performance and sports. Partnering with faculty and students alike to explore problems such as:

- Pacing and nutrition strategies for long-distance racing
- Route selection for traversing highly variable terrain
- Kinematic characteristics of human running stride
- Spatial analysis of player positioning and scoring in team sports
- Live in-play win probabilities for team sports
- Key numbers in sports scoring and their relation to sports betting odds
- Hedging in sports trading markets
- Data visualization and analysis for grand prix car racing
- Individual and team strategy for multi-stage bike racing

PUBLICATIONS

Books

Horton, Kenneth W., Pruitt, Kristopher A., and Bradley A. Warner. "Computational Probability and Statistics." Free Online Textbook (2021).

<https://bawcos.github.io/Computational-Probability-and-Statistics/>

Journal Publications

Pruitt, Kristopher A., and Justin M. Hill. "Optimal pacing and carbohydrate intake strategies for ultramarathons." *European journal of applied physiology* 117.12 (2017): 2527-2545.

Citations: 7

Pruitt, Kristopher A., et al. "A mixed-integer nonlinear program for the optimal design and dispatch of distributed generation systems." *Optimization and Engineering* 15.1 (2014): 167-197.

Citations: 47

Pruitt, Kristopher A., Robert J. Braun, and Alexandra M. Newman. "Establishing conditions for the economic viability of fuel cell-based, combined heat and power distributed generation systems." *Applied energy* 111 (2013): 904-920.

Citations: 45

Pruitt, Kristopher A., Robert J. Braun, and Alexandra M. Newman. "Evaluating shortfalls in mixed-integer programming approaches for the optimal design and dispatch of distributed generation systems." *Applied energy* 102 (2013): 386-398.

Citations: 123

Pruitt, Kristopher A., Richard F. Deckro, and Stephen P. Chambal. "Modeling homeland security." *The Journal of Defense Modeling and Simulation* 1.4 (2004): 187-200.

Citations: 11

Journal Papers in Review

Pruitt, Kristopher A., and Michael A. Brilleslyper. "The Ascending Hiker Problem." PRIMUS: Invited for review and resubmission.

PRESENTATIONS AND LECTURES

Settle, Connor R., Mark, Matthew M., and Kristopher A. Pruitt. "A mathematical model for human running stride." Service Academy Student Mathematics Conference, 23 April 2021.

Brilleslyper, Michael A., and Kristopher A. Pruitt. "Getting to the Top: Less Pain More Gain." Mathfest 2019, Cincinnati, OH, 1 August 2019.

Pruitt, Kristopher A., “Initial Skills Training: New Requirements for Operations Research Analyst Career Field.” 2019 Air Force Operations Research Symposium, Eglin Air Force Base, FL, 12 March 2019.

Pruitt, Kristopher A., and Michael A. Brilleslyper. “Optimal Configurations for Mountain Switchbacks.” 2018 INFORMS Annual Meeting, Phoenix, AZ, 4 November 2018.

Pruitt, Kristopher A., and Justin M. Hill. “Optimal Pacing and Nutrition Strategies for Ultramarathons.” 2016 INFORMS Annual Meeting, Nashville, TN, 16 November 2016.

Pruitt, Kristopher A., “A mixed-integer linear program for the optimal design of human-powered fitness facilities.” 2014 INFORMS Annual Meeting, San Francisco, CA, 11 November 2014.

Pruitt, Kristopher A., et al. “Optimizing the design and dispatch of distributed generation systems.” 2011 INFORMS Annual Meeting, Charlotte, NC, 14 November 2011.

Pruitt, Kristopher A., et al. “Optimizing the Acquisition and Operation of On-site Electricity Generation.” 2010 INFORMS Annual Meeting, Austin, TX, 10 November 2010.

Pruitt, Kristopher A., and Alexandra M. Newman. “Optimizing the Acquisition and Operation of On-site Electricity Generation.” 12th International Conference on Stochastic Programming, Halifax, Nova Scotia, 16 August 2010.

PROFESSIONAL TRAINING

DataCamp

- Data Scientist with R, Career Track (19 courses)
- SQL Fundamentals, Skill Track (5 courses)
- Shiny Fundamentals with R, Skill Track (4 courses)
- Spatial Data with R, Skill Track (4 courses)

PROFESSIONAL AFFILIATIONS

American Statistical Association (ASA) 2020 - present

Institute for Operations Research and the Management Sciences (INFORMS) 2010 - 2019

PROFESSIONAL SERVICE

Pruitt, Kristopher A., Founder and Faculty Mentor. Student Chapter of American Statistical Association. University of Colorado – Boulder, CO, 2022.

Gorman, Michael F. and Kristopher A. Pruitt. Graduate Capstone Committee. Department of MIS, OSC, and Business Analytics, University of Dayton, OH, 2022.

Warner, Bradley A., Hill, Justin M., and Kristopher A. Pruitt. Founding Members. Data Science Committee. United States Air Force Academy, CO, 2020.

Brilleslyper, Michael A., Pruitt, Kristopher A., et al. Hiring Committee. Assistant Professor of Statistics. Department of Mathematical Sciences, United States Air Force Academy, CO, 2020.

Pruitt, Kristopher A., et al. Chair of Organizing Committee. Air Force Operations Research Symposium. Eglin AFB, FL, 2019.

Schaubroeck, Beth E., Pruitt, Kristopher A. et al. Pedagogy, Assessment, and Curriculum Committee. Department of Mathematical Sciences, United States Air Force Academy, CO, 2016-2018.

Brilleslyper, Michael A., Pruitt, Kristopher A., et al. Hiring Committee. Assistant Professor of Applied Mathematics. Department of Mathematical Sciences, United States Air Force Academy, CO, 2017.

Warner, Bradley A. and Kristopher A. Pruitt. Organizing Committee. "Integration of Visual Analytics into USAFA Curriculum." Service Academies Faculty Training Workshop. VACCINE Center and United States Air Force Academy, 2016.

TECHNICAL SKILLS

Programming: R, SQL, MATLAB, VBA, AMPL

Applications: RStudio, pgAdmin (PostgreSQL), Mathematica, Microsoft Office Suite

Platforms: RStudio Cloud, Canvas, Blackboard, WebAssign, DataCamp, Zoom, Slack