

## Elvan Ceyhan

Marguerite Scharnagle Endowed Professor  
Co-director of Consortium Center of Data Science and Innovation  
President of ASA AL-MS Chapter  
Department of Mathematics and Statistics  
Auburn University  
203 Extension Hall, Auburn, AL 36849  
Email: [ceyhan@auburn.edu](mailto:ceyhan@auburn.edu) | [elvanceyhan@gmail.com](mailto:elvanceyhan@gmail.com)  
Website: <http://www.auburn.edu/~ezc0066>  
Phone: 334-844-3613

## Executive Summary

Marguerite Scharnagle Endowed Professor with over two decades of internationally recognized expertise in statistical machine learning, random geometric graphs, network optimization, and spatial data analysis. A pioneer in developing proximity catch digraph methodologies and graph-based learning frameworks with applications in medical imaging, ecological modeling, and adversarial risk analysis. Dr. Ceyhan has authored over 58 peer-reviewed publications, contributed to innovative R software packages adopted worldwide, and secured more than \$1 million in research funding from NSF, ONR, Simons Foundation, and EU Marie Curie Fellowship.

Renowned for interdisciplinary impact and academic leadership, Dr. Ceyhan has served as Deputy Director of SAMSI, co-director of Auburn's Center for Data Science Innovation, and President of the ASA Alabama-Mississippi Chapter. His commitment to excellence in teaching and mentorship has been recognized with the 2024 Marie Kraska Award for Excellence in Teaching, Phi Kappa Phi Love of Learning Award, and induction into the Auburn University Global Teaching Academy and Phi Beta Delta Honor Society.

With a deep dedication to inclusive excellence and transformative pedagogy, Dr. Ceyhan has led initiatives on AI-enhanced education, course redesign, and statistical literacy. He actively mentors graduate students and postdoctoral researchers, many of whom have gone on to successful careers in academia and industry. Through collaborative research, leadership, and service, he continues to advance the frontiers of data science and applied statistics.

## Education

Ph.D. in Applied Mathematics and Statistics, Johns Hopkins University, 2005  
M.S.E. in Statistics/Mathematical Sciences, Johns Hopkins University, 2002  
M.S. in Statistics, Oklahoma State University, 2000  
B.S. in Mathematics, Koç University, Istanbul, Turkey, 1997

## Professional Experience

### Professor (April 2024 – Present) & Associate Professor (July 2019 – April 2024)

*Auburn University*

- **Curriculum Development:**
  - Spearheaded a comprehensive redesign of graduate programs to address evolving industry needs in data science.
  - Introduced AI-driven statistical tools in courses on Bayesian and computational statistics, resulting in a 20% increase in enrollment and significant improvement in student outcomes.
  - Designed and implemented interdisciplinary machine learning courses that are now integral to the department's core curriculum.
- **Teaching Excellence:**
  - Received departmental awards for consistently achieving over 90% positive feedback in student evaluations, earning multiple departmental awards.
  - Recognized for clear communication, innovative teaching methods, and effective integration of AI tools to enhance learning experiences.
  - Achieved recognition from students and faculty for innovative teaching methods that enhanced learning outcomes.
- **Research Innovation:**
  - Published high-impact research advancing methodologies in adversarial risk analysis and stochastic modeling.
  - Established new frameworks integrating statistical machine learning with stochastic optimization, leading to breakthroughs in adversarial risk analysis.
- **Grant Acquisition:**
  - Secured \$700,000 in competitive funding, directly supporting graduate research assistantships and post-doctoral fellowships.

### Deputy Director (2017 – 2019)

*Statistical and Applied Mathematical Sciences Institute (SAMSI)*

- **Program Development and Innovation:**
  - Directed year-long interdisciplinary programs combining statistical learning and applied mathematics, resulting in over 15 collaborative publications and a 25% increase in participant research output.
  - Established cutting-edge workshops blending statistical and applied mathematical sciences.
- **Mentorship, Diversity and Inclusion:**
  - Designed mentorship programs and initiatives for underrepresented groups, increasing participant diversity by 30% within two years.
  - Created sustainable mentorship frameworks, with ~80% of mentees advancing to academic or industry leadership roles.
- **International Collaboration:**
  - Spearheaded collaborations with European institutions, culminating in co-authored publications and joint grant proposals.

## Visiting Associate Professor (2016 – 2017)

*University of Pittsburgh*

- **Teaching Excellence:** Taught advanced statistical courses, integrating real-world applications to enhance student engagement.

## Associate Professor (2011 – 2016) & Assistant Professor (2005 – 2011)

*Koç University, Istanbul*

- **Research Dissemination:** Published foundational work on proximity catch digraphs, cited over 100 times and recognized as a benchmark in the field.
- **Student Mentorship and Achievement:** Supervised PhD candidates whose research earned national and university awards, establishing successful academic and industry careers.
- **Collaborative Research:** Partnered with medical researchers to develop statistical models for imaging data, contributing to three high-impact journal articles.

## Research Interests

- **Statistical Machine Learning & Data Science** – Graph-based classification methods, imbalanced learning, robust inference, and AI-integrated analytics
- **Random Geometric Graphs & Proximity Catch Digraphs (PCDs)** – Theoretical development, structural analysis, and applications in classification and clustering
- **Network Optimization & Traversal** – Algorithmic strategies for the Canadian Traveler Problem and Stochastic Obstacle Scene Problem with adversarial and correlated structures
- **Spatial Point Pattern & Data Analysis** – Nearest-neighbor and graph-theoretic techniques for detecting clustering, segregation, and spatial interactions
- **Statistical Methods for Medical & Neuroimaging Data** – Quantitative modeling and inference for high-dimensional MRI and SWI datasets, with applications in brain morphometry and neonatal imaging

## Research Contributions

- **Interdisciplinary Impact** – Integrated statistical methodology with domains such as medical imaging, environmental sciences, neuroscience, urban fire risk analysis, and language acquisition, resulting in high-impact collaborations and publications.
- **Algorithm Development** – Designed and implemented novel algorithms for network navigation under uncertainty, including obstacle disambiguation and traversal in stochastic environments, significantly extending the classical Canadian Traveler Problem.
- **Methodological Innovation** – Advanced the theory of Proximity Catch Digraphs (PCDs), introducing new families of geometric graphs and graph invariants, with applications to spatial pattern analysis, classification, and outlier detection.
- **Global Recognition & Leadership** – Elected member of the International Statistical Institute (ISI), TWAS Young Affiliate Fellow, and spotlighted by the Marie Curie Alumni Association for excellence in international research.
- **Software & Tools** – Authored and maintained several R packages ('nnspat', 'pcds', 'pcds.ugraph') widely adopted in spatial statistics and machine learning, supporting

reproducible research and community use.

- **Field Advancements** – Published over 58 peer-reviewed articles and 4 discussion notes in prestigious journals; regularly invited to speak at international conferences including INFORMS, World Statistics Congress, and ASA meetings.

## Key Achievements

- **Endowed Professorship & Institutional Recognition** – Awarded the **Marguerite Scharnagle Endowed Professorship** (2024); inducted into the **Auburn University Global Teaching Academy** and **Phi Beta Delta Honor Society** in 2024.

- **Research Excellence** – Authored **58 peer-reviewed journal articles**, 4 discussion notes, and over **90 scholarly presentations**, with contributions spanning theoretical statistics, medical imaging, and machine learning.

- **Leadership in Academia** – Served as **Deputy Director of SAMSI**, **Co-Director of Auburn's Center for Data Science Innovation**, and **President of the ASA AL-MS Chapter**, promoting interdisciplinary collaboration and inclusivity.

- **Mentorship & Teaching Impact** – Supervised multiple MS and PhD theses; mentees have received awards, publications, and prestigious placements. Designed and taught graduate courses in **Bayesian statistics**, **computational statistics**, and **statistical machine learning**, integrating AI-based tools.

- **Grant Success** – Secured over **\$1 million in external research funding**, including PI roles on grants from **NSF**, **ONR**, and **Simons Foundation**, and recipient of the **EU Marie Curie International Outgoing Fellowship**.

- **Technological Innovation** – Developed R packages such as '**nnspace**', '**pcds**', and '**pcds.ugraph**', widely used for proximity-based modeling, spatial data analysis, and geometric learning.

- **Global Recognition** – Delivered invited talks at major conferences including **INFORMS**, **World Statistics Congress**, and **AAAL**, with research featured by the **Marie Curie Alumni Association** and news platforms like **VerticalNews**.

- **Outreach & Service** – Organized data science and statistical literacy workshops for **ASA AL-MS**, benefiting over **500 students and professionals**; contributed to **UN Scientific Advisory Board** and **EU regulatory frameworks**.

## Skills

- **Programming & Software Development** – Proficient in **R**, **Python**, **SAS**, and **LaTeX**; developer and maintainer of widely-used R packages including '**nnspace**', '**pcds**', and '**pcds.ugraph**', supporting advanced spatial analysis and graph-based learning.

- **Statistical & Computational Expertise** – Deep expertise in **Bayesian inference**, **machine learning**, **stochastic optimization**, and **spatial statistics**, with applications in **medical imaging**, **ecological modeling**, and **network analysis**.

- **Research Leadership & Collaboration** – Led interdisciplinary teams and research

centers, supervised **PhD, MS, and postdoctoral researchers**, and facilitated international collaborations yielding high-impact results.

- **Grant Strategy & Acquisition** – Successfully authored and co-led proposals securing **over \$1M in competitive research funding** from **NSF, ONR, Simons Foundation**, and the **EU Marie Curie Fellowship Program**.
- **Curriculum Innovation & Teaching** – Designed and taught graduate-level courses in **computational statistics, Bayesian methods, and AI-enhanced data science**, integrating hands-on tools and interdisciplinary themes.
- **Languages & Communication** – Fluent in **English and Turkish**; experienced in delivering research presentations at international venues and across diverse academic and professional communities.

### Honors and Awards

- **Marguerite Scharnagle Endowed Professorship**, Auburn University, 2024
- **Marie Kraska Award for Excellence in Teaching**, College of Sciences and Mathematics, Auburn University, 2024
- **Phi Kappa Phi Love of Learning Award**, National Honor Society, 2024
- **Inducted into Auburn University Global Teaching Academy**, 2024
- **Inducted into Alpha Upsilon Chapter of Phi Beta Delta Honor Society for International Scholars**, 2024
- **Featured in the Marie Curie Alumni Association Newsletter** – “I Benefited from a Marie Curie Action - IOF in the Spotlight”, 2015
- **TWAS Young Affiliate Fellow**, The World Academy of Sciences (TWAS), 2012–2016
- **Elected Member**, International Statistical Institute (ISI), since 2011
- **Second Best Oral Presentation Award**, 30th National Radiology Congress, Antalya, Turkey, 2009
- **Albert Nelson Marquis Lifetime Achievement Award**, Marquis Who’s Who, 2017
- **Listings in Marquis Who’s Who** – *Who’s Who in the World* (2010–2016), *Who’s Who in America* (2018)
- **Complimentary Membership**, New York Academy of Sciences, 2015–2016

### Selected Accomplishments

- **Principal Investigator** on competitive research grants from **NSF, ONR**, and the **Simons Foundation**, securing **over \$1 million** in external funding
- **Authored 58 peer-reviewed journal articles** and 4 discussion notes in top-tier statistics, machine learning, and interdisciplinary journals
- **Supervised and mentored** numerous graduate theses and dissertations, with students earning awards and placements in academia and industry
- **Developed and maintain** the R packages '**nnspar**', '**pcds**', and '**pcds.ugraph**', adopted globally for proximity-based statistical learning and spatial analysis
- **Served as Deputy Director of SAMSI**, leading year-long programs, workshops for underrepresented groups, and professional development initiatives
- **Co-Director** of Auburn’s **Consortium Center of Data Science Innovation (CDSI)** (2024–present), fostering interdisciplinary research and workforce development

- **Mentor, INFORMS Mentor Match Program** (2024–2025), supporting early-career professionals in applied mathematics and operations research
- **Contributor** to the **UN Scientific Advisory Board Horizon Scanning Exercise** (2025), identifying emerging global scientific priorities
- **Provided expert commentary** on EU Medicines Regulation through the **Data Quality Framework consultation process** (2025)

### Professional & Editorial Services

- **President**, American Statistical Association (ASA) Alabama–Mississippi Chapter, 2024–Present
- **Editorial Board Member**, *Measurement: Interdisciplinary Research and Perspectives*, 2023–Present
- **Associate Editor**, *Journal of Probability and Statistical Sciences*, 2007–2013, 2021–Present
- **Associate Editor**, *Computational Statistics & Data Analysis*, 2008–2016
- **Editorial Board Member**, *Model Assisted Statistics and Applications*, 2007–2012
- **Committee Member**, *AI-Biological Data Workshop Series*, National Academies of Sciences, Engineering, and Medicine (NASEM), 2022–2023
- **Reviewer** for numerous international journals including *Annals of Applied Statistics*, *TEST*, *Pattern Recognition*, *Environmental and Ecological Statistics*, and *Journal of Machine Learning Research*