

# AHMET KAAAN AYDIN

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## EDUCATION

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**Ph.D. in Applied Mathematics** | GPA:4.0 | University of Maryland, Baltimore County | 2022-Present

**M.Sc. in Applied Mathematics** | GPA:4.0 | Western Kentucky University | Bowling Green, KY | 2020-22

- Thesis "Robust Sensor Design for the Novel Reduced Models of the Mead-Marcus Sandwich Beam Equation"

**Pedagogical Formation** | Istanbul University | Istanbul Turkey | 2018-19

**B.Sc. in Mathematics** | GPA:3.14 | Yildiz Technical University | Istanbul Turkey | 2015-19

- Senior Project "Affine, and Projective planes"

## RESEARCH INTERESTS

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**Numerical Analysis:** Stochastic Galerkin, Finite Element Method, Navier-Stokes Equations.

**Control and Optimization:** Boundary Observer Design, Stability Analysis, Feedback Controller Optimization.

## PUBLICATIONS

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- B. Sousedik, **A.K. Aydin**, A Mean-Informed Monolithic Stochastic Galerkin Solver for the Unsteady Navier-Stokes Equations, preprint.
- **A.K. Aydin**, Md Z. Haider, A.Ö. Özer, A New Finite Difference Approximation Preserving Uniform Boundary Observability for a Fully Clamped Euler-Bernoulli Beam, submitted.
- A.Ö. Özer, **A.K. Aydin**, J. Waltherman, A Robust Finite-Difference Model Reduction for the Boundary Feedback Stabilization of Fully dynamic Piezoelectric Beams, **arXiv: 2309.07492**.
- A.Ö. Özer, **A.K. Aydin**, R. Emran, Exponential Stability and Optimization of Sensor Feedback Amplifiers for Fast Stabilization of Magnetizable Piezoelectric Beam Equations, **IEEE Transactions on Automatic Control** accepted.
- **A.K. Aydin**, A.Ö. Özer, A novel sensor design for a cantilevered Mead-Marcus-type sandwich beam model by the order-reduction technique, **ESAIM: Control, Optimization, and Calculus of Variations**, 2023.
- **A.K. Aydin**, A.Ö. Özer, J. Waltherman, A Novel Finite Difference-based Model Reduction and a Sensor Design for a Multilayer Smart Beam with Arbitrary Number of Layers, **IEEE Control Systems Letters**, vol. 7, 1548-1553, 2023.
- **A.K. Aydin**, A.Ö. Özer, Uniform boundary observability of filtered finite difference approximations of a Mead-Marcus sandwich beam equation with only one boundary observation, **61st IEEE Conf. on Decision and Control**, Cancun, Mexico 2022.

## HONORS & AWARDS

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- John D. Minton Award | 2022
  - The **highest university-wide award** given to the single most outstanding graduate student.
- The Outstanding Graduate Student Award, Department of Mathematics, WKU | 2022
- KY NSF EPSCoR SuperCollider best presentation award | 2022
- Dr. James H. Stuteville Scholarship | 2022
- Hugh F. and Katherine A. Johnson Mathematics Scholarship | 2021

## RESEARCH EXPERIENCE

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**Summer Intern** | Wolfram Research | Champaign, IL (Remote) | Summer 2023

- Created mathematics content for Wolfram|Alpha engine in the subject of Linear Algebra.
- Developed step-by-step solutions and implemented them into the Wolfram|Alpha. The projects include determining the dimensions of a matrix, finding the Kronecker Product of two matrices, and matrix decomposition techniques such as LU, Cholesky, and QR.

## Research Assistant | Western Kentucky University | Bowling Green KY | 2021-22

- Supported by the National Science Foundation done research on robust boundary sensor design for finite/infinite dimensional laminated beam models.
- Supervised a team of undergraduate students from Dr. Özer's research group to develop Wolfram Demonstration Projects (WDP) describing vibrations on multi-layer beams.

## SELECTED PRESENTATIONS

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- AMS Central Sectional Meeting, Milwaukee, Wisconsin, April 2024.
- 62<sup>nd</sup> IEEE Conference on Decision and Control, Singapore, December 2023.
- Mid-Atlantic Numerical Analysis Day, Philadelphia, Pennsylvania, November 2023.
- The 8th Annual Meeting of SIAM Central States Section, Lincoln, Nebraska, October 2023.
- SIAM Conference on Control and Its Applications (CT23), Philadelphia, Pennsylvania, July 2023.
- The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Wilmington, North Carolina, June 2023.
- SIAM Southeastern Atlantic Section Annual Meeting, Blacksburg, Virginia, March 2023.
- Joint Mathematics Meeting (JMM), AMS Contributed Paper Session on Numerical Analysis & Poster Session, Boston Massachusetts, January 2023.
- 61<sup>st</sup> IEEE Conference on Decision and Control, Cancun, Mexico, December 2022.
- Differential Equations Seminar, Baltimore, Maryland, November 2022.
- AMS Southeastern Sectional Meeting, Chattanooga, Tennessee, October 2022.
- SIAM Pacific Northwest Section, Vancouver, Washington, May 2022.
- Joint Mathematics Meeting (JMM), AMS Special Session on Asymptotic Behavior of Evolution Equations, Virtual, April 2022.
- Kentucky Section of the Mathematical Association of America Annual Meeting, Virtual, April 2022.
- WKU Student Research Conference, Bowling Green, Kentucky, March 2022.
- 41st WKU Mathematics Symposium, Applied Analysis with an emphasis on PDEs, ODEs, Control, and Stability, Bowling Green, Kentucky, February 2022.
- Kentucky Academy of Science Annual Meeting, Virtual, November 2021.

## SELECTED WORKSHOPS

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- 62<sup>nd</sup> IEEE Conference on Decision and Control, Singapore, December 2023.  
Modern Adaptive Control and Estimation: From Theory to Applications.
- SIAM Mathematical Problems in Industry Workshop, New Jersey 2023.  
Project Title: Bubbles in flow streams and porous media.
- SIAM Graduate Student Mathematical Modeling Camp, Delaware 2023.  
Project Title: Modeling of Drying Process in Porous Media.

## DEMONSTRATION PROJECTS

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[Wolfram Demonstration Projects](#) offer real-time tools to explore complex mathematical concepts.

- J. Waltermann, **A.K. Aydin**, A.Ö. Özer, Stabilization of a Smart Beam with a Tip Mass, **Wolfram Demonstrations Project**, under review.
- J. Waltermann, **A.K. Aydin**, A.Ö. Özer, Rapid Stabilization of Heat and Structure Interactions with Boundary Feedback Controllers, **Wolfram Demonstrations Project**, under review.
- J. Waltermann, **A.K. Aydin**, S. Leveridge, A.Ö. Özer, Longitudinal Piezoelectric Beam Dynamics, **Wolfram Demonstrations Project**, 2023.
- **A.K. Aydin**, M. Poynter, A.Ö. Özer, Vibration Suppression on a Hinged Three-Layer Sandwich Beam, **Wolfram Demonstrations Project**, 2023.
- **A.K. Aydin**, M. Poynter, A.Ö. Özer, Feedback Sensor Design for a Cantilevered Three-Layer Sandwich Beam, **Wolfram Demonstrations Project**, 2022.
- J. Waltermann, **A.K. Aydin**, M. Poynter, A.Ö. Özer, Stabilization of the Wave Equation by the Direct Fourier Filtering, **Wolfram Demonstrations Project**, 2022
- M. Poynter, L. Stewart, **A.K. Aydin**, A.Ö. Özer, Boundary-Feedback Control of Vibrations on a String with and without Filtering, **Wolfram Demonstrations Project**, 2022.

## LEADERSHIP

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**IEEE Next-Com Virtual Ambassador** | 2023-Present

- One of the [founding members](#) of IEEE Control Systems Society Next-Com.

**Graduate Senator (UMBC)** | 2024-Present

- Elected senator of Graduate Senate representing College of Natural and Mathematical Sciences.

**Classroom Committee (UMBC)** | 2024-Present

**Unity Committee (UMBC)** | 2020-2024

**Graduate Assistant Advisory Committee (UMBC)** | 2024-Present

**SIAM Student Chapter** | 2020-2024

- Served as the president at UMBC and Western Kentucky University.

**The Graduate Council (WKU)** | Western Kentucky University | 2021-2022

**Student Research Grants Committee (WKU)** | Western Kentucky University | 2021-2022

- Reviewed the university wide grant applications.

## TEACHING EXPERIENCE

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**Teaching Assistant** | University of Maryland, Baltimore County | Baltimore, MD | 2022-Present

- Led seminars and discussions for Precalculus, Applied Calculus, and Multivariable Calculus courses by creating lesson plans, quizzes, and holding office hours which ensured student.
- Instructor for Calculus I course in Summer'24

**Teaching Assistant** | Western Kentucky University | Bowling Green, KY | 2020-21

- Led recitation sessions, created content, graded assignments, and tutored students in Calculus courses.
- Tutored at the Mathematics Testing Center for the summer of 2021.
- Successfully completed Graduate Teaching Assistant Institute (GATI) modules I & II and became eligible to be a Graduate Assistant Instructor.
- Awarded with 2021 Summer assistantship position. Received an offer to be a Graduate Instructor.

**Mathematics Teacher** | Haydar Akin Vocational High School | Istanbul, Turkey | 2018-19

- Taught 9th and 10th-grade mathematics courses for a semester with the supervision of a Mathematics teacher and a pedagogical expert.