Aidan W. Murphy

Dr.Aidan.Murphy@gmail.com ■ Home Page ■ LinkedIn

PROFESSIONAL EXPERIENCE

Johns Hopkins Applied Physics Laboratory

Senior Professional Staff, 2023-

Virginia Tech

Visiting Assistant Professor, 2022

EDUCATION

Ph.D., Mathematics, Virginia Tech, 2022
M.S., Mathematics, Virginia Tech, 2020
B.S., Mathematics, S.U.N.Y. Geneseo, 2017

PUBLICATIONS

- G.L. Matthews, T. Morrison, and A.W. Murphy, Curve-lifted codes for local recovery using lines, in review. Link here
- G. Micheli and A.W. Murphy. Locally recoverable codes and finding good polynomials. Springer Publishing, expected 2024.
- G.L. Matthews, A.W. Murphy, and W. Santos, Fractional decoding of r-Hermitian codes. Designs, Codes, and Cryptography, August 2023. Link here
- G.L. Matthews and A.W. Murphy. Norm-trace-lifted codes over binary fields. IEEE International Symposium on Information Theory (ISIT), July 2022. Link here
- A.W. Murphy. Codes from norm-trace curves: local recovery and fractional decoding. Ph.D. Thesis, April 2022. Link here
- G.L. Matthews and A.W. Murphy. Cryptography, in Mathematics in Cyber Research. CRC Publishing, February 2022. Link here
- G.L. Matthews, A.W. Murphy, and W. Santos. Fractional decoding of codes from the Hermitian curve. IEEE International Symposium on Information Theory (ISIT), July 2021. Link here
- W. Gerych, L. Buquicchio, K. Chandrasekaran, A. Abdulaziz, H. Mansoor, A. Murphy, E. Rundensteiner, and E. Agu. BurstPU: Classification of Weakly Labeled Datasets with Sequential Bias. IEEE BigData Conference, December 2020. Link here

GOVERNMENT PROJECTS

Johns Hopkins Applied Physics Laboratory

- Unmanned Maritime Systems, January 2023-
  Description: Improved systems engineering processes with respect to security and autonomy of naval capabilities.

- Defensive Cyber Initiatives, January 2023-
  Technical Lead, August 2023-
  Description: Explored non-mathematical approaches to metrology, with a focus of improving understanding of resilience of cyberphysical systems.
- Applied Quantum Communications, May 2023-January 2024
  Description: Worked on leveraging internal APL quantum channel models in tandem with modern quantum error correction methods.
- Cyber Anomaly Detection, February 2023-December 2023
  Description: Collaborated on formation of anomaly detection framework for military platform electronics buses, with an aim for near-future integration.

INVITED CONFERENCE TALKS

- Norm-trace-lifted codes. AMS Fall Central Sectional Meeting, Special Session on Coding, Storage, and Related Applications. Online (October 2021).
- Codes from curves and repair. CanaDAM 2021, Minisymposium on Algebraic and Combinatorial Approaches to Designs and Codes. Online (May 2021).

AWARDS AND RECOGNITION

Johns Hopkins Applied Physics Laboratory

- Asymmetric Operations Sector Peer Recognition Desk Award
  - Unmanned Maritime Systems Project, April 2023
    "For Leadership and Technical Excellence"

Virginia Tech

- "Thank a Teacher" Recognition, 2022

S.U.N.Y. Geneseo

- Edward P. Daniels Scholarship, 2016
  - "Awarded to a senior Math student with a solid academic record and who demonstrates leadership and integrity."

UNDERGRADUATE STUDENT MENTORING

Johns Hopkins Applied Physics Laboratory
Defensive Cyber Initiatives Intern, Summer 2023

TEACHING EXPERIENCE

Virginia Tech
Visiting Assistant Professor

- Math 1225: Calculus of a Single Variable: Fall 2022 (x2).
  Modalities: 2 in-person.

Graduate Teacher of Record

- Math 1225: Calculus of a Single Variable: Spring 2020, Fall 2020, Summer II 2021, Fall 2021, Spring 2022.
  Modalities: 2 in-person, 2 online, 1 transitioned mid-semester (COVID)
  Notes: 2 ESL sections, as part of the AdvantageVT Program
- Math 1226: Calculus of a Single Variable: Spring 2021.
  Modalities: 1 online.

Math GRE Tutor, VT PREP Program, Fall 2021
Grader, Math 2204: Introduction to Multivariable Calculus, Summer I 2020
Lab Instructor, Math 1026: Elementary Calculus, Spring 2019

Clemson University
Grader

- Math 4120: Algebra I, Spring 2018
- Math 3190: Introduction to Proof, Spring 2018

Teaching Assistant, Math 1080: Business Calculus II, Fall 2017

S.U.N.Y. Geneseo
Lab Instructor

- Physics 116: General Physics II Lab, Spring 2017
- Physics 114: General Physics I Lab, Fall 2016

ADDITIONAL PRESENTATIONS

Conference talks

- Fractional decoding of norm-trace-lifted codes, ACTiV(T) (Algebraic Coding Theory at Virginia Tech), Virginia Tech (November 2022).

Seminar talks

- Norm-trace-lifted codes, Algebra Seminar, Virginia Tech (October 2021).
- Cyclic algebraic geometry codes (Part 2), Applied Algebra Research Group (AARG), Virginia Tech (September 2021).
- Cyclic algebraic geometry codes (Part 1), Applied Algebra Research Group (AARG), Virginia Tech (August 2021).
- Fractional decoding of codes from Hermitian curves (Part 2), Applied Algebra Research Group (AARG), Virginia Tech (March 2021).
- Fractional decoding of codes from Hermitian curves (Part 1), Applied Algebra Research Group (AARG), Virginia Tech (February 2021).
- Finding Tamo-Barg good polynomials with Galois theory (Part 2), Applied Algebra Research Group (AARG), Virginia Tech (February 2020).

- Finding Tamo-Barg good polynomials with Galois theory (Part 1), Applied Algebra Research Group (AARG), Virginia Tech (February 2020).
- Repair scheme of Guruswami and Wootters, Applied Algebra Research Group (AARG), Virginia Tech (October 2019).

Other professional talks

- Sponsor Brief, Unmanned Maritime Systems Project, Johns Hopkins Applied Physics Laboratory (February 2024).
- Sponsor Brief, Defensive Cyber Initiatives Project, Johns Hopkins Applied Physics Laboratory (October 2023).
- Sponsor Brief, Unmanned Maritime Systems Project, Johns Hopkins Applied Physics Laboratory (October 2023).
- Quantum error-correction, QK Tech Talk, Johns Hopkins Applied Physics Laboratory (September 2023).

High school level

- Error-correcting codes, ASPIRE Program Brown-bag series, Johns Hopkins Applied Physics Laboratory (August 2023).
- Computational complexity, ASPIRE Program Brown-bag series, Johns Hopkins Applied Physics Laboratory (July 2023).
- Error-correcting codes, ASPIRE Program Brown-bag series, Johns Hopkins Applied Physics Laboratory (July 2023).

Undergraduate level

- Code-based cryptography, Part III: McEliece's cryptosystem, Resilient Military Systems (QCM) Brown-bag series, Johns Hopkins Applied Physics Laboratory (July 2023).
- Code-based cryptography, Part II: Computational hardness, Resilient Military Systems (QCM) Brown-bag series, Johns Hopkins Applied Physics Laboratory (May 2023).
- Code-based cryptography, Part I: Error-correcting codes, Resilient Military Systems (QCM) Brown-bag series, Johns Hopkins Applied Physics Laboratory (April 2023).
- How to Prove (in fewer pages than Bertrand Russell) that $1 + 1 = 2$, Math Club, Clemson University (September 2017).

Graduate level

- Locally recoverable codes, Virginia Tech Research Day, Virginia Tech (November 2022).
- Codes from the Hermitian curve (guest lecture), Mathematics 5114 (Topics in Algebra: Applied Algebra), Virginia Tech (April 2022).
- Algebraic geometry codes (guest lecture), Mathematics 5114 (Topics in Algebra: Applied Algebra), Virginia Tech (April 2022).
- Welch-Berlekamp decoding of Reed-Solomon codes, Mathematics 5114 (Topics in Algebra: Applied Algebra), Virginia Tech (February 2022).

- Reed-Solomon codes, Mathematics 5114 (Topics in Algebra: Applied Algebra), Virginia Tech (January 2022).
- Locally recoverable codes, Mathematics Senior Graduate Teaching Assistant (SGTA) Seminar, Virginia Tech (November 2020).

Graduate (other)

- Making progress on your dissertation, Mathematics Senior Graduate Teaching Assistant (SGTA) Seminar, Virginia Tech (February 2022).
- Workshop: Creating your own website, Mathematics Senior Graduate Teaching Assistant (SGTA) Seminar, Virginia Tech (August 2021).

LEADERSHIP

Cyber Analytics Capability Area, Johns Hopkins Applied Physics Laboratory

- Co-lead, March 2023 -

Graduate and Professional Student Senate, Virginia Tech

- Departmental Senator, Fall 2020 - Spring 2022
- Committee on Judicial and Internal Affiars, Fall 2020 - Spring 2022
  - Chair, Fall 2020 - Spring 2021
- Constitution Transition Committee, Summer 2021
- Subcommittee on Constitutional Overhaul, Fall 2020 - Spring 2021
  - Chair, Fall 2020 - Spring 2021
- Parliamentarian of the Senate, Fall 2020 - Spring 2021
- Elections Subcommittee, Spring 2021
  - Chair, Spring 2021

Programming and Data Science Club, S.U.N.Y. Geneseo

- Co-Founder
- Vice President, Fall 2016 - Spring 2017
- Treasurer, Fall 2016 - Spring 2017

DEPARTMENTAL SERVICE

Johns Hopkins Applied Physics Laboratory

Internal Paper Reviews

- 2023: June 14, September 22

Candidate Interviewer (2023-)

- 2024: January 24, February 9
- 2023: October 13, November 14, November 30

Combustion Grant Reviewer (2023-)

- 2024: Cycle 18 (x1)
- 2023: Cycle 17 (x1)

Sponsor Visit Organizer/Host (March 15, 2023)

Virginia Tech
Faculty Candidate Student Host

- Mathematics of Quantum Algorithms, Coding, or Cryptography (Spring 2022)
- Mathematics of Coding or Cryptography (Fall 2019)

VOLUNTEER WORK

MORE Undergraduate Workshop, Virginia Tech, (October 8-9, 2022)
Explore Physical Sciences Camp Professional Panelist (July 22, 2022)
MORE Undergraduate Workshop, Virginia Tech, (September 25-26, 2021)
MORE Undergraduate Workshop, Virginia Tech, (September 26-27, 2020)
MORE Undergraduate Workshop, Virginia Tech, (October 26-27, 2019)
Project WISE, Clemson University, (June 24-29, 2018)
MAA Southeastern Section Spring Meeting, Clemson University (March 23-24, 2018)
MAA Seaway Section Spring Meeting, S.U.N.Y. Geneseo (April 15-16, 2016)

Last Updated: 2024/04/01