

Mohamed Wafik ElSheikh

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RESEARCH INTERESTS

Arithmetic Statistics; Arithmetic Dynamics; Analytic and Algebraic Number Theory.

EDUCATION

Ph.D. in Mathematics, University of South Carolina, Columbia, SC, USA — 2022 – Present
Area: Arithmetic Statistics. Advisor: Frank Thorne. GPA: 4.0/4.0.

M.Sc. in Mathematics, Sabancı University, Istanbul, Turkey — 2020 – 2022
Thesis: “Primitive Prime Divisors in the Critical Orbit of Polynomial Dynamical Systems.” Advisor: Mohammad Sadek. GPA: 4.0/4.0.

B.S. in Electronics and Communication Engineering, American University in Cairo, Egypt — 2013 – 2018
Minors: Computer Science, Mathematics. GPA: 3.83/4.0.

PUBLICATIONS

1. M. Sadek, M. Wafik, and T. Yesin, “Arithmetic progressions in polynomial orbits,” *International Journal of Number Theory*, 20(8) (2024), 2009–2025.
2. M. Sadek and M. Wafik, “Construction of polynomials with prescribed divisibility conditions on the critical orbit,” preprint.
3. M. Wafik, “Finite Fourier transform of doubly singular binary quintic forms,” preprint.

RESEARCH EXPERIENCE

Doctoral Research, University of South Carolina. Advisor: Frank Thorne — 2022 – Present

- Compute finite Fourier transforms of invariant functions on spaces of binary forms, extending Bhargava–Taniguchi–Thorne work on spaces of lower degree binary forms to the setting of binary quintic forms.
- Reduce the computation to point counts on auxiliary varieties indexed by splitting type, the most delicate governed by a hyperelliptic curve arising from the Hessian covariant.

M.Sc. Thesis Research, Sabancı University. Advisor: Mohammad Sadek — 2020 – 2022

- Established construction results for primitive prime divisors in the critical orbit of $x^d + c$ over $\mathbb{Q}$ and local fields; developed proofs with computational evidence gathered with Magma and Mathematica.
- Results extended into two subsequent papers on divisibility conditions on critical orbits and coverings of polynomial orbits by arithmetic progressions.

TEACHING EXPERIENCE

Instructor of Record, Discrete Math for Computer Science, University of South Carolina — Aug 2025 – May 2026

Instructor of Record, Calculus for Business and Social Science, University of South Carolina — Jan 2025 – May 2025

Instructor of Record, Intensive Basic College Math, University of South Carolina — Aug 2024 – Dec 2024

Instructor of Record, Calculus for Business and Social Science, University of South Carolina — *Aug 2023 – Jul 2024*

Teaching Assistant, Calculus 2, University of South Carolina — *Jan 2023 – May 2023*

Teaching Assistant, Calculus 1, University of South Carolina — *Aug 2022 – Dec 2022*

Teaching Assistant, Discrete Mathematics, Sabancı University — *Feb 2022 – Jun 2022*

Teaching Assistant, Linear Algebra, Sabancı University — *Sep 2021 – Jan 2022*

Teaching Assistant, Calculus 2, Sabancı University — *Feb 2021 – Jun 2021*

Teaching Assistant, Calculus 1, Sabancı University — *Sep 2020 – Jan 2021*

Undergraduate Teaching Assistant, Calculus IV, American University in Cairo — *Sep 2016 – Jan 2017, Sep 2017 – Jan 2018*

Undergraduate Teaching Assistant, Mechanics II (Dynamics), American University in Cairo — *Feb 2015 – Jun 2015, Feb 2016 – Jun 2016*

Undergraduate Teaching Assistant, Linear Algebra, American University in Cairo — *Feb 2018 – Jun 2018*

Undergraduate Teaching Assistant, Calculus II, American University in Cairo — *Feb 2014 – Jun 2014*

GRANTS, FELLOWSHIPS, AND AWARDS

Outstanding First Year Graduate Student, University of South Carolina — *2022 – 2023*

TÜBİTAK Scholarship (Scientific and Technological Research Council of Turkey), Sabancı University — *2021 – 2022*

Full Tuition Scholarship, Sabancı University — *2020 – 2021*

Highest Honors Achievement, Office of the Registrar, American University in Cairo — *2018*

Academic Achievement Scholarship, Office of Student Financial Aid, American University in Cairo — *2013 – 2018*

Honors Achievement, School of Sciences and Engineering, American University in Cairo — *2016, 2017, 2018*

CONFERENCES, WORKSHOPS, AND TALKS

FOUVRY73 Summer School, Bernoulli Center, EPFL, Lausanne, Switzerland — *Aug 2026*

Algorithmic Number Theory Symposium (ANTS XVII), Bernoulli Institute, Groningen, Netherlands — *Jul 2026*

SMS 2026: Universal Statistics in Number Theory, Université de Montréal, Montréal, Québec, Canada — *May 2026*

South Eastern Regional Meeting on Numbers (SERMON), Clemson University, Clemson, SC, USA — *Apr 2026*

Palmetto Number Theory Series (PANTS), Clemson University, Clemson, SC, USA — *Oct 2023*

Journée Arithmétique 2023, University of Lorraine, Nancy, France — *Jul 2023*

Arizona Winter School 2023: Unlikely Intersections, University of Arizona, Tucson, AZ, USA — *Mar 2023*

SuSAAN Summer School, Nesin Mathematics Village, İzmir, Turkey — *Jun 2022*

Invited Talk: “Primitive Prime Divisors of Integer Sequences,” Bahar Matematik Buluşmaları (Spring Mathematics Meetings), Turkey — *Oct 2021*

CIMPA Preparation Course, Boğaziçi University, Istanbul, Turkey — *Aug 2021*

NON-ACADEMIC EXPERIENCE

Junior Validation Engineer, Valeo, Cairo, Egypt — *Dec 2018 – Sep 2020*

- Automated test-case execution for park-maneuver-assist functionality with Python; reviewed requirements for testability.

Data Science Intern, Teradata, Cairo, Egypt — *Aug 2017*

Circuit Design Intern, Indian Mesh Pvt. Ltd., Chandigarh, India — *Aug 2016*

EXTRACURRICULAR ACTIVITIES

Vice Chairman, IEEE Student Branch, American University in Cairo — *2015 – 2018*

OGCDP Member, AIESEC, American University in Cairo — *2014 – 2015*

SKILLS

Technical: C++, Java, Python, Mathematica, Magma, LaTeX (proficient); SQL, MATLAB, Cadence, VHDL, CAPL (intermediate).

Languages: English and Arabic (fluent); Turkish (basic).

REFERENCES

Available upon request.