ÖMER KÜÇÜKSAKALLI

Middle East Technical University
Department of Mathematics
Ankara, 06800, Turkey
+90 312 210 5397
komer@metu.edu.tr

Education

- **University of Massachusetts, Amherst** – *Ph.D. Mathematics 2009.*
(Thesis Supervisor: Siman Wong)
- **University of Massachusetts, Amherst** – *M.S. Mathematics 2006.*
- **Middle East Technical University** – *B.S. Mathematics 2004.*

Employment

- **Professor** – *Middle East Technical University, 2025 – current.*
- **Associate Professor** – *Middle East Technical University, 2014 – 2025.*
- **Assistant Professor** – *Middle East Technical University, 2010 – 2014.*
- **Instructor** – *Middle East Technical University, 2009 – 2010.*
- **Teaching Assistant** – *University of Massachusetts, Amherst, 2004 – 2009.*

Research Interests

- **Elliptic Curves** – *Complex multiplication and elliptic units.*
- **Finite Fields** – *Arithmetical exceptionality of polynomial or rational maps.*
- **Lie Algebras** – *Generalized Chebyshev polynomials.*

Publications

- **On the Jacobian Matrices of Generalized Chebyshev Polynomials** – *Joint with Ahmet İleri, (2025). To appear in Journal of Lie Theory.*
- **Value sets of folding polynomials over finite fields** – *Turk. J. Math., 43, (2019), 1407–1413.*
- **A proof of the Lucas-Lehmer test and its variations by using a singular cubic curve** – *Journal of Integer Sequences, 21, (2018), Article 18.6.2.*
- **Value sets of bivariate folding polynomials over finite fields** – *Finite Fields Appl., 54, (2018), 253–272.*
- **On the Arithmetic Exceptionality of Polynomial Mappings** – *Bull. London Math. Soc., 50, (2018), 143–147.*
- **Arithmetic Exceptionality of Generalized Lattès Maps** – *Joint with H. Önsiper. J. Math. Soc. Japan 70 No.2 (2018) 823–832.*
- **Bivariate polynomial mappings associated with simple complex Lie algebras** – *J. Number Theory, **168**, (2016), 433–451.*
- **Value sets of bivariate Chebyshev maps over finite fields** – *Finite Fields Appl., **36**, (2015), 189–202.*
- **On the computation of generalized division polynomials** – *Turk J. Math, **39**, (2015), 547–555.*

- **On the units generated by Weierstrass froms** – *LMS J. Comput. Math, **17** (2014), suppl. A, 303-313 (ANTS 2014 proceeding).*
- **Value sets of Lattès maps over finite fields** – *J. Number Theory, **143**, (2014), 262–278.*
- **A recurrence relation for Bernoulli numbers** – *Hacet. J. Math. Stat. **42** (2013), no 4, 319–329.*
- **Class numbers of ring class fields of prime conductor** – *Acta Arith. **153** (2012), no. 3, 251–269.*
- **Class numbers of ray class fields of imaginary quadratic fields** – *Math. Comp. **80** (2011), no. 274, 1099–1122.*

Graduate Students

- **Sait Elmas, in progress, doctorate** –
- **Derya Acar, in progress, master's** –
- **Metin Azmaz, in progress, master's** –
- **Ahmed Omar, 2024, master's** – *Exploring Bernoulli numbers and their applications.*
- **Ahmet İleri, 2023, master's** – *On the Jacobian martices of generalized Chebyshev polynomials.*
- **Oğuzhan Odabaş, 2023, master's** – *Arithmetically exceptional Lattès maps attached to elliptic curves without complex multiplication.*
- **Muhammed Aydoğdu, 2021, master's** – *Coefficients of folding polynomials attached to Lie algebras of rank two.*

Selected Talks

- **Machine and Mathematics** – *Arf Symposium, Istanbul University, 2024.*
- **Arithmetically exceptional polynomial mappings** – *Number Theory Seminar, Bilkent University, Ankara, 2024.*
- **Generalized Chebyshev polynomials and dynamical systems** – *Ankara Matematik Günleri XV, Hacı Bayram Veli University, Ankara, 2024.*
- **On the Jacobian matrices of generalized Chebyshev polynomials** – *Ulusal Matematik Sempozyumu, Trakya University, Edirne, 2023.*
- **Certain polynomials associated with simple Lie algebras and permutations of finite fields** – *Journées Arithmétiques XXXI, İstanbul University, 2019.*
- **Multivariable Chebyshev polynomials and finite fields** – *Ulusal Matematik Sempozyumu 2019, Ondokuz Mayıs University, Samsun, 2019.*
- **Arithmetically exceptional polynomial mappings and Lie algebras** – *Ankara Matematik Günleri XIV, Gazi University, Ankara, 2019.*
- **Arithmetically exceptional polynomial mappings** – *7. Cemal Koç Algebra Days, Bilkent University, Ankara, 2019.*
- **Arithmetically exceptional polynomial mappings** – *Boğaziçi University, İstanbul, 2019.*
- **Polynomial mappings associated with simple complex Lie algebras** – *Çankaya University, Ankara, 2018.*
- **Bivariate polynomial mappings associated with simple complex Lie algebras** – *Sabancı University, İstanbul, 2017.*
- **Bivariate polynomial mappings associated with simple complex Lie algebras** – *13th International Conference on Finite Fields and Their Applications (FQ13), Gaeta, Italy July 2017.*

- **Bivariate Chebyshev polynomials constructed with the help of rank two Lie algebras** – *Ankara Matematik Günleri XII, May 2017.*
- **Value sets of bivariate Chebyshev maps over finite fields** – *Ankara Matematik Günleri XI, May 2016.*
- **Value sets of Lattès maps over finite fields** – *12th International Conference on Finite Fields and Their Applications (FQ12), Saratoga Springs, NY, USA, July 2015.*
- **On the units generated by Weierstrass forms** – *Ankara Matematik Günleri X, June 2015.*
- **On the units generated by Weierstrass forms** – *Algorithmic Number Theory Symposium (ANTS XI), Gyeoungju, South Korea, August 2014.*
- **Value sets of Lattès maps over finite fields** – *Ankara Matematik Günleri IX, June 2014.*
- **Smaller generators for some class fields** – *Antalya Algebra Days, May 2014.*
- **Rational function analogue of Dickson polynomials** – *Cemal Koç Algebra Days II, Düzce University, April 2014.*
- **Certain CM-class fields with smaller generators** – *Algebraic Curves and Cryptography Workshop, Carl-von-Ossietzky Universität Oldenburg, July 2013.*
- **A recurrence relation for Bernoulli numbers** – *Ankara Matematik Günleri VII, May 2012.*
- **Schoof's Algorithm** – *Arithmetic Seminar, Metu, November 2011.*
- **Explicit Elliptic Units and an Application** – *Colloqium, Koç University, October 2011.*
- **Cyclotomic Fields** – *Number Theory Winter School, Nesin Matematik Köyü, February 2011.*
- **Frey Curves and Fermat's Last theorem** – *Bilkent Algebraic Geometry Seminar, October 2010.*
- **Zeta Functions and L-Series** – *Algebraic Numbers and L-functions Workshop at Adrasan, September 2010.*
- **A Brief History of Class Number** – *Algebra Seminar, Bilkent University, May 2010.*
- **Computing Class Numbers via Elliptic Units** – *Number Theory, Arithmetic and Algebraic Geometry, Northern Cyprus, April 2010 (also in Antalya Algebra Days XII).*
- **An Introduction to Elliptic Curves** – *Number Theory Workshop, Nesin Matematik Köyü, January 2010.*
- **Complex Multiplication** – *General Seminar, Metu, November 2009.*
- **Class Numbers of Ray Class Fields of Imaginary Quadratic Fields** – *Five College Number Theory Seminar, Amherst, November 2008 (also in Uconn, Sabancı, Boğaziçi, Metu, Bilkent).*

Teaching Experience

- **Theory of Function Fields** – *Graduate*
- **Elliptic Curves** – *Graduate*
- **Lie Algebras** – *Graduate*
- **Algebraic Number Theory** – *Graduate*
- **Algorithmic Number Theory** – *Graduate*
- **Elliptic Curves in Cryptography** – *Graduate*
- **Algebra I & II** – *Graduate*
- **Commutative Algebra** – *Graduate*
- **Groups and Geometry** – *Undergraduate*
- **Introduction to Representation Theory** – *Undergraduate*

- **Ideals Varieties and Algorithms** – *Undergraduate*
- **Field Extensions and Galois Theory** – *Undergraduate*
- **Elementary Number Theory I & II** – *Undergraduate*
- **Introduction to Differential Equations** – *Undergraduate*
- **Fundamentals of Mathematics** – *Undergraduate*
- **Discrete Mathematics** – *Undergraduate*
- **Basics of Mathematics I & II** – *Undergraduate*
- **Calculus I & II** – *Undergraduate*

Awards & Projects

- Tübitak 1001 Research Project 124F146, Two New Approaches for Generalized Chebyshev Polynomials, October 2024– October 2026.
- Tübitak International Research Project TBAG-112T011 (joint with German BMBF-01DL12038), 2012–2014.
- Metu Scientific Research Project (BAP), 2011–2012.
- Teaching Assistanship from Umass, 2004–2009.
- Scholarship from Tübitak, 2002–2004.

Computer Skills

- PARI/GP, C, Linux, Matlab, Mathematica, LaTeX, Html.