

Curriculum Vitae

Meral Tosun

Galatasaray University (GSU)
Departement of Mathematics
Çırağan cd. No. 36
34357 Beşiktaş
Istanbul, Turkey
G-mail: mrltosun@gmail.com
Phone: +90 212 227 44 81
Web: <http://math.gsu.edu.tr/tosun/>

Research Interest

Singularities in algebraic geometry: Resolution of singularities, Deformations of singularities, Topology of singularities, Invariants of singularities, Classification of singularities by Lie algebras. Quivers. Representation theory. Toric geometry. Tropical geometry. Combinatorics. Computer algebra systems. Algebraic Geometry and applications.

Education

PhD in mathematics : University of Aix-Marseille I, Marseille, France (March 1998).

Title : *Rational singularities of complex surfaces*

Advisor : Prof. Le Dung Trang

DEA in mathematics : University of Paris VII, Paris, France.

MSc in mathematics : Yıldız Technical University, Istanbul, Turkey.

Title : *Linear difference equations and the hypergeometric equations*

BSc in mathematics : Marmara University. Istanbul-Turkey.

Academic Positions

Affiliate Member at Kavli IMPU, Tokyo Japan. February 2024-present

Professor at Galatasaray University, Istanbul, Turkey, January 2017-present.

Associate professor at Galatasaray University, Istanbul, Turkey, January 2007-July 2017.

Postdoctoral fellowship at Instituto de Matematicas UNAM, Cuernavaca-Mexico, 2002-2004.

Assistant professor at Yildiz Technical University, Istanbul, Turkey, 2001-2006.

Part-time research fellowship at Feza Gursey Institute, Istanbul-Turkey, 2000-2006.

Post-doctoral fellowship at The Abdus Salam ICTP, Trieste-Italy, January 1999-July 2000.

Teaching assistant (ATER) at Aix Marseille I University, France, 1997-1998.

Research Assistant at Yildiz Technical University, Istanbul, Turkey, 1989-1992.

Publications

- *Singularites rationnelles des surfaces complexes*, Ph.D. Thesis, 1998.
- *Arbres associes aux singularites rationnelles*, C. R. Acad. Sci. Paris, t.329, Serie I (1999).
- *Tyurina components and rational cycles for rational singularities*, Turkish J.Math. 23, (3) (1999).
- Combinatorics of rational surface singularities, Comment. Math. Helv., 79 (2004). Joint work with Le D. T.

- ADE Singularities, chambers and toric varieties, Séminaire et Congrès, 10 (2005).
- Classification of rational singularities of surfaces, Int. J. Pure Appl. Math. 41 (2007). Joint work with A. Ozkan and Z. Oer.
- Toric varieties associated with weighted graphs, Int. Math. Forum, (2) no.33-36 (2007). Joint work with S. Altınok.
- Semi-universal deformations of some simple elliptic singularities, C. R. Acad. Sci. Paris, Ser. I 345 (2007). Joint work with K. Nakamoto.
- Some surface singularities obtained via Lie algebras, Singularities in geometry and topology, World Scientific Publ. Co. Pte. Ltd, (2006).
- Generators for semigroup of Lipman, Bull. Braz. Math.Soc, New series, 39 no.1-13, (2008). Joint work with S. Altınok.
- Invariants of open books of links of surface singularities, Studia Sci. Mat. Hungarica, 48-1, (2011). Joint work with A.Nemethi.
- Simple Singularities and Simple Lie Algebras, TWMS Jour. Pure Appl. Math. v.2,no.1 (2012). Joint work with Le D. T.
- Simple Elliptic Singularities and Generalization of Slodowy Slices, J. of Algebra, v.376 (2013). Joint work with K. Nakamoto.
- Nonisolated forms of Rational Triple Points via Newton Polygon, Rocky Mountain J. Math. (46) no.2 (2016). Joint work with A. Altıntaş and G. Cevik.
- Triple Root Systems, Rational Quivers and Examples of Linear Free Divisors, Int. J. of Math. (29), n.03 (2018). Joint work with A.Sharland and K.Nakamoto.
- The embedded Nash problem of birational models of rational triple singularities, Joint work with B.Karadeniz Sen, H.Mourtada and C.Plénat, J. of Singularities, V.22 (2020).
- Finite dimensional Lie algebras in singularities, Joint work with J.L.Cisneros Molina. Handbook of Geometry and Topology of Singularities V.1, Springer (2020).
- Lojasiewicz exponent of a surface: An intrinsic view, Joint work with E.Bilgin and G.Kaya. Preprint on arxiv.
- Towards the affine and GIT quotients of the Borel moment map, Joint work with M. Seong Im. To appear in Contemporary Math., 2024.
- Minimality of a toric embedded resolution, after Bouvier and Gonzalez-Sprinberg, Joint work with B.Karadeniz and C.Plénat. To appear in Kodai Math. J., 2024.
- Algorithm providing explicit equations of rational singularities, Joint work with A.Altıntaş Sharland, C.O. Oğuz and Z.Zafeirakopoulos. In preparation.
- On the Nash resolution of rational singularities, Joint work with E.G.Barroso, J.Snoussi, Ö.Turhan. In preparation.
- Curves on the surface determining the singularity, Joint work with C.Plénat. In progress.
- Representations and surface singularities, Joint work with J.L. Cisneors-Molina. In progress.
- Bambou and McKay Correspondence, Joint work with Y.Ito, K.Sato. In preparation.

Editorial works

- **Co-editor in** *Arrangements and Local Systems and Singularities*, Birkhauser-Progress in Mathematics v.283 (2010). Joint work with F.ElZein, A.Suciu, A.M. Uludağ, S.Yuzvinsky.
- **Co-editor in** *"A Panorama of Singular Varieties"*, Contemporary Math. v.742 (2020). Joint work with F.Castro-Jiménez, D.Massey and B.Teissier.

Grants/Research funds

- *Geometry of elliptic surface singularities obtained by Lie algebra*, Research project. Galatasaray Univ. 2007-2009.
- The Abdus Salam ICTP, Trieste, Italy, Associate Membership, 2009-2014.
- *Rational Singularities of Surfaces, Lie algebras and quivers*, Research project 1001. TUBITAK. 2010-2013.
- *Surface singularities and Newton polygon*, Research project. Galatasaray Univ. 2011-2013.
- *Singularidades locales de superficies complejas*, UNAM-Mexico (researcher), 2011-2014.
- *Topology of singularities of complex surfaces*, TUBITAK-CNRS project. 2013-2015.
- *Equations defining rational singularities and their invariants*, Research project 1001. TUBITAK. 2014-2017.
- *Ultrametric Spaces appearing in Singularity Theory*, Research project. Galatasaray Univ. 2016-2019.
- *Jets, arcs and invariants of singularities*, TUBITAK-France Bosphorus Program, 2018-2021.

Teaching Experience

Galatasaray University. Undergraduate level/Graduate level

Sabancı University. Graduate level

Nesin Mathematics Village. Undergraduate level/Graduate level

Yildiz Technical University. Undergraduate/Graduate level

University of Aix-Marseille I. Undergraduate level

Yeditepe University. Undergraduate level

Courses thought on undergraduate level: Calculus, Topology, Linear algebra, Differential geometry, Complex analysis, Groups and geometry, Toric geometry, Ordinary differential equations, Introduction to algebraic geometry, Abstract algebra, Ideals and varieties, Advanced linear algebra, Introduction to real analysis. Probability. Statistics.

Courses thought on graduate level: Advanced analysis, Advanced algebra, Singularities of complex surfaces, Local analytic geometry, Algebraic curves, Discrete mathematics, Selected topics in algebraic geometry, Probability and Statistics.

Some of the short courses:

- *Resolution of surface singularities* at IMPA, Brazil (February 2020).
- *Singularities and Lie Algebras* at La Laguna University, Tenerife (July 2015).
- *Riemann-Roch Theorem* at Feza Gursey Institute, Istanbul (January 2005).
- *Bezout's Theorem* at UNAM, Unidad Cuernavaca. Mexico (November 2003).

Post-doctoral Fellows Supervised

- Dieter Van Der Bleeken (Netherlands) 2011, by TUBITAK 1001 grant.
- Richard Gonzalez (Peru) 2012, by TUBITAK 1001 grant.
- Zafeirakis Zafeirakopoulos (Greece), 2015, by Tubitak 1001 grant.
- Mehmet Kılıç (Turkey) 2019, by Tubitak-France PHC Bosphorus grant.
- Can Ozan Oğuz, (Turkey) 2020, by Tubitak-France PHC Bosphorus grant.
- Ezgi Kantarcı Oğuz, (Turkey), 2022, by Tubitak-BIDEB grant.

Graduate Students Supervised

- T.Çolak, *Symmetric chain decompositions of some posets*, Galatasaray Univ., MsC. Present.
- Ö.Turhan, *Some invariants of hypersurface singularities* Galatasaray Univ., MsC, 2023.
- B.Karadeniz Şen, *Gebze Technical Univ.*, PhD. October 2024.
- B.Karadeniz, *Jet schemes of some surface singularities*, Galatasaray Univ., 2017.
- E.Balcı, *Singularities, Sails and Kites*, Galatasaray Univ., 2016.
- B.Ötüş, *Tropical hypersurfaces and Groebner fan*, Koç Univ. 2015 (co-advisor T.Etgü).
- A.Gündüz, *Quivers and Root Systems*, Marmara University, 2014.
- G.Çevik, *Resolution of some non-isolated singularities*, Koç Univ. 2011.
- E.Bilgin, *On a theorem of Katz*, Istanbul Technical Univ., 2009.
- A.Altıntaş, *Geometry of toric varieties*, Yıldız Technical University, 2004.

Some of the supervised undergraduate projects

- N.Şengezer, *Classification des sous-groupes finis de $GL(2,C)$ et $GL(3,C)$* , 2024.
- M.Ali Koçhan, *Sous-Gropes Finis de $SL(2,C)$* , 2024.
- H.Birinci, *Sur les points entiers d'un polytope*, 2023.
- E. Peso, *Suites de Hilbert des Idéaux*, 2021.
- Z. Topçu, *La Loi Puissance de Taylor et Emballage de Cercles*, 2021.
- A. Kalle, *Système de Racines et Algèbre Invariante*, 2021.
- B.Budak, *Representations of $sl(2,C)$* , 2020.
- B.S.Kazan, *Theoreme de Bezout*, 2020.
- E.Gökçeoğlu, *Brève Introduction à la Géométrie Torique*, 2020.
- H.Yener, *Arbres de Newton d'idéaux dans un anneau à deux variables*, 2018.
- E.Ozgür, *Triangulation-tetraédrisation*, 2018.
- I. Eksioğlu, *Problemes d'optimisation*, 2017.
- B. Aysever, *Théorème de Frobenius*, 2017.
- E. Hacıkamiloglu, *Combinatoire des idéaux monomes*, 2017.
- Ş. Aktaş, *Décomposition de Minkowski*, 2016.
- R.M. Gül, *Géométrie tropicale et réseaux de Young*, 2015.
- E.Koçak, *Algèbres de Lie de petite dimension*, 2014.
- B.Karadeniz, *Modification torique*, 2013.
- İ.Kaspi, *Singularités des hypersurfaces tropicales*, 2012.
- C.Tozlu, *Diviseurs libres en géométrie algébrique*, 2012.
- Z.Topçu, *Une brève introduction à la géométrie tropicale*, 2011.
- H.Ergün, *Sur la clasification des algèbres de Lie*, 2011.

Invited Research Talks (Conference/Workshop/Colloquium)

- Kinoshita Algebraic Geometry Symposium, Kyoto, October 2024.
- UNAM Instituto de Matematicas, *AGATA Seminar series, Mexico. February 2023.*
- UAEM Cuernavaca, *Colloquium talk, Mexico. February 2023.*
- UNAM Instituto de Matematicas, *Colloquium talk, Mexico. February 2023.*
- Workshop on Geometry and Physics, ICMS-Bulgaria, July 2022.
- Balıkesir University, *Colloquium talk, Balıkesir, Turkey, February 25, 2022.*
- Seminario de Álgebra, Geometría algebraica y Singularidades, La Laguna University, Tenerife, *January 2022 (online).*

- Women in Mathematics in South-Eastern Europe, ICMS-Sofia, Bulgaria, Dec. 2021 (online).
- Gdańsk-Kraków-Łódź-Warszawa Seminar in Singularity Theory, Poland, Nov. 2021 (online).
- Istanbul University, Colloquium talk, Istanbul, Turkey, November 2021 (online).
- Selçuk University, Colloquium talk, Konya, Turkey, October 2021 (online).
- Gdańsk-Kraków-Łódź-Warszawa Seminar in Singularity Theory, Poland, March 2021 (online).
- UNAM Instituto de Matematicas, Colloquium talk, Mexico. March 2021 (online).
- ODTU-Bilkent Algebraic Geometry Seminars, February 2021 (online).
- Geometry workshop, Turkey Mathematics Club, January 2021 (online).
- 16th International Workshop on Real/Complex Singularities, Brazil, November 2020 (online).
- Transgvanabara school of algebraic geometry, IMPA, Brazil, February 2020.
- 7th Spring Mathematics meetings, Bogazici University, Istanbul, February 2020.
- Universite d'Aix-Marseille, Colloquium talk, France, September 2019.
- University of Istanbul, Colloquium talk, April 2019.
- 15th International Workshop on Real and Complex Singularities, Brasil. July 2018.
- La Laguna University, Colloquium talk, Tenerife, Spain. May 2018.
- Workshop on Determinantal Singularities, Leibniz Univ., Hannover, Germany. March 2018.
- Marmara Science Days, Marmara University, Istanbul. October 2017.
- UNAM Instituto de Matematicas, Colloquium talk, Mexico, August 2017.
- Panorama on Singular Varieties, Conference, Sevilla-Spain, February 2017.
- Séminaires Singularités, Universite d'Aix-Marseille, France, December 2016.
- Kültür University, Colloquium talk, Istanbul, November 2016.
- Ankara Mathematics Days, Ankara University, May 2016.
- Turkish women in Mathematics, Çorum, November 2015.
- National Mathematics Symposium, Akdeniz University, September 2015.
- Topics in Geometry, International Meeting at IMBM Bosphorus University, May 2015.
- Workshop in Singularities, Yucatan University, Merida, Mexico. December 2014.
- Rochester University, Geometry Topology Seminars, USA. November 2014.
- Columbia University, Algebraic Geometry Seminars, New York, USA. November 2014.
- Women in Mathematics in Turkey, Gebze Institute of Tecnology, Turkey. May 2014.
- Tropical Geometry in Europe, IMBM, Istanbul. May 2014.
- Complex-algebraic aspects of tropical geometry. Lausanne, Switzerland. March 2013.
- Institute of Technology, Colloquium talk. Gebze, Turkey. February. 2013.
- Middle East Technical University (ODTU). Ankara, Turkey. November 2013.
- Singularities Summer School. Fes, Morocco, September 2012.
- Workshop on Singularities, METU Northern Cyprus Campus. April 2012.
- Istanbul Technical University, Colloquium talk. Istanbul. February 2012.
- Abant İzzet Baysal University, Colloquium talk. Bolu, Turkey. November 2010.
- Fatih University, Mathematics Colloquium talk. Istanbul, Turkey. October 2010.
- Antalya Algebra Days, Turkey. May 2010.
- Galatasaray University, Faculty of Science and Arts. Istanbul, Turkey. March 2010.
- Mimar Sinan Fine Arts University, Colloquium talk. Istanbul, Turkey. November 2009.
- International School/Conference on Foliations, Dynamical Systems, Singularity Theory, Perverse Sheaves, Samarkand State University, Uzbekistan. October 2009.

- Bogazici University, Colloquium talk. Istanbul, Turkey. April 2009.
- Tata Fundamental Research Institute, Mumbai, India. February 2009.
- Izmir Algebraic Geometric Topology Days, 9 Eylül University, Izmir, Turkey. January 2009.
- Koç University, Colloquium talk. Istanbul, Turkey. December 2008.
- Sabanci University, Colloquium talk. Istanbul, Turkey. November 2008.
- Alfred Renyi Institute, Budapeste, Hungary. October 2008.
- Turkish Mathematical Society meeting, Koç University, Istanbul, Turkey. September 2008.
- Workshop on Singularities, Tokyo University of Sciences, Japan. August 2008.
- Fudan University, Colloquium talk. Shanghai, China. January 2008.
- Workshop on Geometry and Topology of Singularities, UNAM Mexico. January 2007.
- 9th International Workshop on Real and Complex Singularities, Brasil. July 2006.
- Advanced school/workshop on singularities in geometry and topology, The Abdus Salam ICTP, Italy. September 2005.
- Antalya Algebra Days. International conference, Antalya, Turkey. May 2005.
- Istanbul Technical University, Colloquium talk, Istanbul, Turkey. April 2005.
- Workshop on topology of hypersurfaces, Tokyo Metropolitan Univ., Japan. Sept. 2004.
- Middle East Technical University (ODTU), Colloquium talk. Ankara, Turkey. April 2003.
- XXXV Congreso Nacional de Soc. Matematica Mexicana. Durango, Mexico. Oct. 2003.
- Coloquio de geometria e algebraica. CIMAT, Guanajuato. Mexico. October 2002.
- Bilkent Algebra Day. Bilkent University. Ankara, Turkey. January 2002.
- Antalya Algebra Days. International conference. Antalya, Turkey. May 2001.
- Bilkent Algebra Day. Bilkent University. Ankara, Turkey. March 2001.
- Bilkent University, Colloquium talk. Ankara, Turkey. March 2001.
- Bosphorus University, Colloquium talk. Istanbul, Turkey. December 2000.
- Geometry-Topology semester. Feza Gursey Institute. Istanbul, Turkey. May 2000.
- Algebraic geometry seminar. The Abdus Salam ICTP, Italy. September 1998.
- K-theory and Algebraic Topology colloquium. The Abdus Salam ICTP, Italy. March 1999.
- Topology seminar. Universite d'Aix Marseille I. Marseille, France. March 1997
- Congres International sur les singularités. St. Quentin University, France. December 1996.

Popular Mathematics, Talks/Education/Activites

- **2nd Istanbul Mathematics Festival**, Galatasaray University, İstanbul. May 2018.
- **Fenerbahçe High School**, Pi day talk, Istanbul (March 2022)
- **TeDx talks** - St. Benoit High School, Istanbul (June 2021) (Zoom).
- **Bilim, Matematik, Oyun**, H.T.Karabağlı Secondary School, Muğla. February 2021 (Zoom).
- **Konya Mathematics Festival**, Konya Science Center, Turkey. October 2020.
- **Pi-day Colloquium**, Yıldız Technical University, Istanbul. March 2019.
- **Career in Mathematics**, Istanbul Üsküdar High-school, October 2018.
- **1st Istanbul Mathematics Festival**, Galatasaray University, İstanbul. May 2018.

Scientific (Co-)Organizations

- Workshop on *Algebraic Geometry, Computational Commutative Algebra and their effectiveness applications*, Galatasaray Univ., June 2024.
- Workshop on Algebraic and Applied Topology III, Galatasaray Univ., September 2021.
- Minischool on Singularities of Surfaces, Galatasaray Univ., İstanbul. November 2019.

- Workshop on *A Panorama on Singular Varieties*, IMUS Sevilla, Spain. February 2017.
- School on Algebra, Geometry and Topology of Singularities, Gebze Technical University and Galatasaray University, Istanbul, May 2016.
- School for women in mathematics, Bogazici University, Istanbul, August 2013.
- School for women in mathematics, Bilkent University, Ankara, August 2012.
- Short courses on Functoriality and Correspondence by R.P.Langlands, Galatasaray Univ., April 2011.
- Cimpa-Tubitak School and Conference on Commutative Algebra and Applications to Combinatorics and Algebraic Geometry, Galatasaray Univ. and Feza Gursey Enstitute, Istanbul, September 2010.
- GTEM/TUBITAK Summer School on Geometry and Arithmetic around Galois Theory, Galatasaray University, Istanbul, June 2009.
- Cimpa Summer School on Arrangements, Local systems and Singularities. Galatasaray University, Istanbul. June 2007.
- Short courses on "History of mathematics I-II" by R.P.Langlands. Yildiz Technical University, Istanbul, in June 2003 and in May 2004.
- Workshop on Singularity theory. Feza Gursey Institute. Istanbul, June 2001.

Some of the Long Term Scientific Visits

The Abdus Salam ICTP, Trieste, Italy.
 Tokyo Metropolitan University, Japan.
 Columbia University, United States of America.
 Yamanashi University, Japan.
 Tata Institute of Fundamental Research, India.
 Alfred Renyi Institute, Hungary.
 Fudan University, China.
 Aix-Marseille University, France.
 UNAM Unidad Cuernavaca-Instituto Matematicas, Mexico.

Editor/Reviewer

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 İTÜ Fen Bilimleri Dergisi

Professional Services

- Head of the Departement of Mathematics, Galatasaray Univ., July 2023-September 2024.
- Coordinator of Geometry Section, Galatasaray Univ., 2001-2003.
- Member of the Senate, Galatasaray Univ., 2018-2021.
- Member of Executive Board of the Faculty of Science-Arts, Galatasaray Univ., 2017-2021.
- Vice-Dean Faculty of Science and Arts, Galatasaray Univ., August 2015-January 2019.
- Head of the Departement of Mathematics, Galatasaray Univ., 2010-2011.
- Coordinator of Logic and Foundations Section, Yıldız Technical Univ., 2001-2003.

Membership

Turkish Mathematical Society
Turkish Women in Mathematics

Languages

Turkish (mother tongue), English, French, Spanish.