Nour Alnajjarine

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Education

2018–2022 **Ph.D. in Mathematics**,
Faculty of Engineering and Natural Sciences, Sabanci University, Istanbul, Turkey,
Thesis: "Orbits of tensors over finite fields",
Advisor: Prof. Dr. Michel Lavrauw.
GPA: 3.86/4.

2016–2018 **Master of Science in Mathematics**,
Graduate school of Natural Science, Gebze Technical University, Gebze, Turkey,
Thesis: "On character degrees of finite groups and some associated graphs",
Advisor: Assoc. Prof. Dr. Roghayeh Hafezieh.
GPA: 4/4.

2010–2014 **Bachelor of Science in Mathematics**,
Faculty of Science (3rd branch), Lebanese University, Lebanon,
GA: 76.31/100,
Rank: 4th (among $\approx$ 300 students).

Employment

2018–2022 Teaching Assistant, Sabanci University, Istanbul, Turkey.

2023–2024 Lecturer, Lebanese International University, Beirut, Lebanon.

2024-present Postdoctoral Researcher, University of Rijeka, Rijeka, Croatia.

Scholarships

2015–2018 YTB Master Degree Fellowship, The Scientific and Technological Research Council of Turkey.

2018–2022 FENS Ph.D. Fellowship, Faculty of Engineering and Natural sciences, Sabanci University.

Services

- Reviewer for Designs, Codes and Cryptography.
- Reviewer for Mathematical Review (MathSciNet).

Teaching Experience

I have served as a lecturer at the Lebanese International University and as a teaching assistant at Sabanci University, contributing to the following courses:

- Linear Algebra: Fall 2018-2019.
- Discrete Mathematics: Spring 2018-2019, Spring 2020-2021, Fall 2021-2022.
- Introduction To Probability: Fall 2019-2020, Spring 2019-2020, Fall 2020-2021.
- Introduction to Algebra: Spring 2021-2022.
- Calculus 1: 2023.
- Algebra 1: 2023.

Research Interests

My research lies within the intersection of algebra, geometry, coding theory, cryptography and combinatorics. More specifically I am interested in studying geometric and combinatorial properties of tensors and investigating problems related to their decomposition, classification, characterization and application. I use for this aim tools from algebraic geometry, projective geometry, combinatorics and computer algebra. Additionally, I am interested in studying the interplay between structures of finite groups and combinatorial properties of graphs associated with their character degree sets.

Publications

- Block designs arising from the space of the Veronese surface, in preparation.
- Symmetric representation of planes and solids in $\mathrm{PG}(8,q)$, in preparation.
- Nets of conics of rank one in $\mathrm{PG}(2,q)$ for $q \geq 4$ even, submitted, 2025.
- Linear complete symmetric rank-distance codes (with Michel Lavrauw), submitted , 2025.
- Webs and squabs of conics over finite fields (with Michel Lavrauw), Finite Fields and Their Applications, 2024.
- A classification of planes intersecting the Veronese surface over finite fields of even order (with Michel Lavrauw), Designs, Codes and Cryptography, 2023.
- Solids in the space of the Veronese surface in even characteristic (with Michel Lavrauw and Tomasz Popiel), Finite Fields and Their Applications, 2022.
- Determining the rank of tensors in $\mathbb{F}_q^2 \otimes \mathbb{F}_q^3 \otimes \mathbb{F}_q^3$ (with Michel Lavrauw), MACIS 2019, Lecture Notes in Computer Science 11989, 2020.

Developed Computational Tools

T233: a GAP-package that determines the ranks of tensors in the 18-dimensional vector space $\mathbb{F}_q^2 \otimes \mathbb{F}_q^3 \otimes \mathbb{F}_q^3$ (T233 webpage).

S2F3xFr: a GAP-package focused on determining the $\mathrm{PGL}(3,q)$-orbits of linear systems of conics in $\mathrm{PG}(2,q)$, exploring their combinatorial properties and complete invariants. This package aims to enhance the understanding of these systems and contribute to the classification of nets of conics in $\mathrm{PG}(2,q)$, an open problem dating back to 1914 (available upon request).

Contributed Talks

- Nets of conics in $\mathrm{PG}(2,q)$, q even, Finite Geometry and Friends, Brussels, Belgium, Upcoming: September 2025.
- Linear complete symmetric rank-distance codes, Finite Geometries, Seventh Irsee Conference, Irsee, Germany, Upcoming: August 2025.
- Partially Symmetric Tensors: Connections and Classifications, Mathematical Research Seminar, Koper, Slovenia, November 2024.
- Tensors: Connections and Classifications, Finite Mathematics Seminar, Rijeka, Croatia, October 2024.
- Webs and squabs of conics of conics over finite fields, Combinatorial Designs and Codes 2024, Seville, Spain, July 2024.
- A contribution towards the classification of tensors in $\mathbb{F}_q^3 \otimes S^2\mathbb{F}_q^3$, q even, Finite Geometry and Friends, Brussels, Belgium, Sep 2023.
- Planes intersecting the Veronese surface in $\mathrm{PG}(5,\mathrm{q})$, q even: Sixth Irsee Conference, Irsee, Germany, Aug 2022.
- Orbits of tensors over finite fields: Summer School on Finite Geometry, Istanbul, Turkey, Aug 2022.
- Solids and the Veronese variety in PG(5,q), q even: Sabanci Algebra Seminars, Sabanci University, Mar 2021.
- Pencils of conics in PG(2,q), q even: eSeminar UGent-VUB, Ghent University and Vrije Universiteit Brussel, Mar 2021.

- On character degrees of finite groups and some associated graphs: Sabanci Algebra Seminars, Sabanci University, Sep 2018.
- Determining the rank of tensors in $\mathbb{F}_q^2 \otimes \mathbb{F}_q^3 \otimes \mathbb{F}_q^3$: MACIS conference, Nov 2019.
- On character degrees of finite nonsolvable groups and some associated graphs, Gebze Technical University, 2018.

Contributed posters

- On character degrees of finite groups and some associated graphs, GTÜ Post Graduate Research Symposium and Publicity Days, 2018.

Languages

Arabic: Mother-tongue.
English: Fluent.
Turkish: Fluent.
French: Basic Knowledge.

Computer Skills

Operating Systems: Microsoft windows, LINUX.
Software: Word, Excel, Powerpoint, LATEX, Maple, GAP, C++, Python, Magma.

References

- Prof. Dr. Michel Lavrauw (PhD Thesis Advisor):
  Faculty of Mathematics, Natural Sciences and Information Technologies, University of Primorska, Koper, Slovenia.
  E-mail: michel.lavrauw@famnit.upr.si
  Homepage: osebje.famnit.upr.si/ michel.lavrauw
  Telephone: +90 216 483 90 00

- Prof. Dr. Dean Crnković (Post Doc Advisor):
  Faculty of Mathematics, University of Rijeka, Rijeka, Croatia.
  E-mail: deanc@math.uniri.hr
  Homepage: www.math.uniri.hr/ deanc
  Telephone: +385 051 584 656

- Assoc. Prof. Dr. Andrea Švob (Post Doc Advisor):
  Faculty of Mathematics, University of Rijeka, Rijeka, Croatia.
  E-mail: asvob@math.uniri.hr
  Homepage: math.uniri.hr/djelatnici/andrea-svob
  Telephone: +385 051 584 675

- Assoc. Prof. Dr. Roghayeh Hafezieh (Masters Thesis Advisor):
  Department of Mathematics, Faculty of Science Istanbul, Gebze Technical University, Kocaeli, Turkey.
  E-mail: roghayeh@gtu.edu.tr
  Homepage: www.gtu.edu.tr/rhafezieh
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- Asst. Prof. Dr. John Sheekey (A member of my PhD thesis progress committee):
  School of Mathematics and Statistics, University College Dublin, Dublin, Ireland.
  E-mail: john.sheekey@ucd.ie

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