Muhammad Afifurrahman

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RESEARCH INTERESTS Arithmetic statistics, analytic number theory, finite fields, additive combinatorics.

ACADEMIC EMPLOYMENT

Ulsan National Institute of Science and Technology, *Postdoctoral Research Associate*
Ulsan, South Korea, 09/2026 - present

EDUCATION

University of New South Wales, *PhD in Mathematics* Sydney, Australia, 09/2022 – 05/2026
- Thesis: Arithmetic statistics of algebraic groups
- Advisors: Alina Ostafe, Igor E. Shparlinski

Institut Teknologi Bandung, *M.Si (MSc) in Mathematics* Bandung, Indonesia, 07/2020 – 10/2021
- Thesis: Polynomial parametrization for some classes of maximum Sidon sets over finite fields
- Advisor: Aleams Barra

Institut Teknologi Bandung, *S.Si (BSc) in Mathematics* Bandung, Indonesia, 07/2016 – 07/2020
- Thesis: On the mumber of different entries in involutory MDS matrices over finite fields of characteristic two
- Advisor: Aleams Barra

LIST OF PUBLICATIONS AND PREPRINTS

As in general mathematical research conventions, all authors are presumed to have equal contributions.

12. **M. Afifurrahman** and W. B. Wicaksono, 'Statistics of centralizers of integer matrices', Preprint, 2026, arXiv:2611.11287, submitted.
11. **M. Afifurrahman**, 'Statistics of divisor functions over function fields', Preprint, 2026, arXiv:2610.11240, submitted.
10. **M. Afifurrahman**, V. Iverson and G. C. Sanjaya, 'Multiplicatively dependent integer vectors on a hyperplane', *J. Lond. Math. Soc.* **114** 1 (2026), e70631. arXiv:2510.10855.
9. **M. Afifurrahman** and F. F. Hadiputra, 'Upper bounds on the odd graceful chromatic number of graphs', *Proyecciones (Anfotagasta)*, to appear. arXiv:2508.17799
8. **M. Afifurrahman** and C. C. Corrigan, 'Moments of restricted divisor functions', *Mathematika*, **72** (2026), e70060. arXiV:2501.15372.
7. **M. Afifurrahman**, 'A uniform formula on the number of integer matrices with given determinant and height', *J. Number Theory*, **281** (2026), 741-770. arXiV:2407.08191.
6. **M. Afifurrahman**, D. I. D. Primaskun, P. E. Putri, L. P. Wijaya, 'On constructing 1-factors of labelled complete graph', *Bol. Soc. Mat. Mex.* **31** 82 (2025).
5. **M. Afifurrahman**, V. Kuperberg, A. Ostafe and I. E. Shparlinski, 'Statistics of ranks, determinants and characteristic polynomials of rational matrices', *Forum Math.* **37** 4 (2025), 1259-1289. arXiV:2401.10086.
4. A. Barra and **M. Afifurrahman**, 'The total vertex irregularity strength for cubic graphs with a perfect matching', *Discrete Math.*, **348** 5 (2025), 114402.
3. **M. Afifurrahman**, 'Some counting questions for matrix products', *Bull. Aust. Math. Soc.*, **110** 1 (2024), 32–43. arXiV:2306.04885.
2. **M. Afifurrahman** and A. Barra. 'Determining Sidon polynomials on Sidon sets over finite fields', *J. Algebra Comb. Discrete Struct. Appl.*, **11** 3 (2024), 175–187. arXiV:2111.08886.
1. **M. Afifurrahman**. 'On the number of different entries in involutory MDS matrices over finite fields of characteristic two', *AIP Conference Proceedings* **2423** 060002 (2021). arXiV:2111.08352.

INVITED TALKS

14. UNIST Number Theory Group Seminar, UNIST, Ulsan, South Korea, November 2026. Multiplicatively dependent integer vectors on a hyperplane.
13. Guest Lecture, Chungbuk National University, Cheongju, South Korea, November 2026. Multiplicatively dependent integer vectors on a hyperplane.
12. Algebra Joint Seminar, Komunitas Pecinta Aljabar Indonesia (online), June 2026. Arithmetic statistics of multiplicatively dependent integer vectors.
11. Visiting Colloqium, Universitas Gadjah Mada, Yogyakarta, Indonesia, June 2026. Arithmetic statistics of multiplicatively dependent integer vectors.
10. ITB Analysis and Geometry Seminar, Institut Teknologi Bandung, Bandung, Indonesia, May 2026. Counting integer points on some singular algebraic varieties.
9. UNSW Number Theory Seminar, UNSW, Sydney, Australia, April 2026. Statistics of divisor functions over function fields.
8. UNSW Canberra Number Theory Seminar, UNSW ADFA, Canberra, Australia, November 2025. Multiplicatively dependent integer vectors on a hyperplane.

7. University of Waterloo Number Theory Seminar (online), October 2025. Multiplicatively dependent integer vectors on a hyperplane.
6. UNSW Number Theory Seminar, UNSW, Sydney, Australia, October 2025. Multiplicatively dependent integer vectors on a hyperplane.
5. Visiting Talk, Universitas Indonesia, Depok, Indonesia, February 2025. Counting rational matrices with bounded height.
4. Visiting Colloqium, Universitas Gadjah Mada, Yogyakarta, Indonesia, February 2025. A uniform formula on the number of integer matrices with given determinant and height.
3. Visiting Talk, Universitas Diponegoro, Semarang, Indonesia, January 2025. Counting rational matrices with bounded height.
2. Visiting Talk, Institut Teknologi Bandung, Bandung, Indonesia, December 2024. Counting rational matrices with bounded height.
1. UNSW Number Theory Seminar, UNSW, Sydney, Australia, May 2024. Arithmetic statistics of rational matrices with bounded height. Slides.

CONTRIBUTED TALKS

15. The 69th Annual Meeting of the Australian Mathematical Society 2025, La Trobe University, Melbourne, Australia, December 2025. Multiplicatively dependent integer vectors on a hyperplane.
14. 13rd Number Theory Down Under Conference, University of Canterbury, Christchurch, New Zealand, August 2025. Moments of restricted divisor functions: an introduction.
13. UNSW Number Theory Days, UNSW, Sydney, Australia, August 2025. Multiplicatively dependent integer vectors on a hyperplane.
12. UNSW School of Mathematics & Statistics Postgraduate Conference, UNSW, Sydney, Australia, August 2025. How to count 2×2 matrices.
11. 33èmes Journées Arithmétiques, University of Luxembourg, Luxembourg, July 2025. A uniform formula on the number of integer matrices with given determinant and height.
10. Combinatorial Number Theory And Connected Topics (CONTACT - IV) (online), March 2025. A uniform formula on the number of integer matrices with given determinant and height.
9. Joint AustMS-NZMS-AMS Conference, University of Auckland, Auckland, New Zealand, December 2024. A uniform formula on the number of integer matrices with given determinant and height.
8. 7th Australian Mathematical Sciences Students Conference 2024, Western Sydney University, Sydney, Australia, December 2024. Counting rational matrices with bounded height.
7. 12nd Number Theory Down Under Conference, La Trobe University, Bendigo, Australia, September 2024. A uniform formula on the number of integer matrices with given determinant and height.
6. UNSW School of Mathematics & Statistics Postgraduate Conference, UNSW, Sydney, Australia, August 2024. Counting rational matrices with bounded height.
5. Combinatorial Number Theory And Connected Topics (CONTACT - III) (online), March 2024. Counting products of integer matrices with bounded height.
4. First Joint IIIMT – Algebra Forum Conference 2023, Universitas Mataram, Mataram, Indonesia (online), December 2023. Arithmetic statistics of rational matrices with bounded height.
3. The 67th Annual Meeting of the Australian Mathematical Society 2023, University of Queensland, Brisbane, Australia, December 2023. Arithmetic statistics of rational matrices with bounded height. Slides.
2. 11th Number Theory Down Under Conference, Australian National University/Mathematical Science Institute, Canberra, Australia, September 2023. Counting products of integer matrices with bounded height. Slides.
1. MathTech 2020, Universiti Sains Malaysia, Penang, Malaysia (online), November 2020. On the number of different entries in involutory MDS matrices over finite fields of characteristic two.

OTHER TALKS

6. The 69th Annual Meeting of the Australian Mathematical Society 2025, La Trobe University, Melbourne, Australia, December 2025. Mettamatika: how to make illustrated mathematics books.
5. Flash Presentation, Hong Kong Laureate Forum 2025. Number theory and arithmetic statistics.
4. Invited talk, Universitas Gadjah Mada, Yogyakarta, Indonesia, February 2025. Doctoral studies in mathematics outside Indonesia.
3. Invited talk, Universitas Diponegoro, Semarang, Indonesia, January 2025. Doctoral studies in mathematics outside Indonesia.
2. Invited talk, Institut Teknologi Bandung, Bandung, Indonesia, December 2024. Doctoral studies in mathematics outside Indonesia.
1. PhD confirmation talk, UNSW, Sydney, Australia, May 2023.

REFEREED JOURNALS

Commun. comb. optim., Finite Fields and Their App.
Also reviewed for Mathematical Reviews and Zent.bl. MATH.

TEACHING EXPERIENCES

Freelance mathematics tutor 10/2017 – present

- Various private tutoring with various levels, from high school admissions to mathematical competitions preparation. Also tutored in Indonesian International Mathematical Olympiad training camps.

Class tutor, *University of New South Wales* 05/2024 – 05/2026

- Course tutored including MATH1011 Fundamentals of Mathematics, MATH1081 Discrete Mathematics, MATH1131 Mathematics 1A, MATH1141 Higher Mathematics 1A, MATH1151 Mathematics for Actuarial Studies and Finance 1A, MATH1231 Mathematics 1B, MATH1241 Higher Mathematics 1B and MATH1251 Mathematics for Actuarial Studies and Finance 1B.

Invigilator and marker, *University of New South Wales* 12/2022 – 05/2022
Drop-in Centre tutor, *University of New South Wales* 05/2023 – 05/2026
Drop-in Centre tutor, *Institut Teknologi Bandung* 08/2019 – 05/2021
Invigilator and marker, *Institut Teknologi Bandung* 10/2018 – 05/2022

SELECTED AWARDS

- **Young Scientist**, Hong Kong Laureate Forum 2025.
- **Young Researcher**, Heidelberg Laureate Forum 2025.
- **People's Choice Award**, UNSW School of Mathematics & Statistics Postgraduate Conference 2025.
- **Fast Track Program Awardee**, Institut Teknologi Bandung, 2020-2021.
- **First Prize**, International Mathematics Competition for University Students, Blagoevgrad, Bulgaria, 2019.
- **Gold Medal** in Mathematics, Olimpiade Nasional Matematika & Ilmu Pengetahuan Alam [National Olympiad of Mathematics and Natural Sciences], Makassar, Indonesia, 2019.

SELECTED SCHOLARSHIPS AND GRANTS

- **AustMS Lift-off Fellowship**, 2026.
- **CRM Grant** for SMS summer school, 2026.
- **UNSW Tuition Fee Scholarship + Research Stipend Scholarship**, 2022-2026.
- **UNSW School of Mathematics and Statistics Top-Up Scholarship**, 2022-2026.
- **AustMS Student Support Scheme Grant**, 2023, 2024, 2025.
- **HKLF Travel Grant**, Hong Kong Laureate Forum 2025.
- **HLF Grant**, Heidelberg Laureate Forum 2025.
- **Accommodation Grant**, 33èmes Journées Arithmétiques, 2025.
- **UNSW GRS Development and Research Training Grant**, 2024, 2025
- **AMSI Travel Grant** for AMSI Summer School, 2023.
- **GTA 100 Scholarship**, Institut Teknologi Bandung, 2020-2021.

SELECTED WORKSHOPS AND SUMMER SCHOOLS

- Arithmetic, L-functions, and Pseudorandomness, Banff International Research Station (online), 2026.
- SMS 2026 - Universal Statistics in Number Theory, Centre de Recherches Mathématiques, Montreal, 2026.
- Beginning To Teach, University of New South Wales, 2025.
- Computational Aspect of Thin Groups, Institute for Mathematical Sciences & National University of Singapore, 2024.
- AMSI Summer School 2023, University of Melbourne, 2023.
- SSANT2021 Summer School in analytic number theory, Université de Paris (online), 2021.
- Circle Method Summer School, Hausdorff School for Advanced Studies in Mathematics, Universitat Bonn (online), 2021.
- Research Experience in Mathematics, HSE University, Moscow, Russia (online), 2021, supervised by Ilya V. Vyugin.

OUTREACH ACTIVITIES AND SERVICES

- **Joint host**, Podcast Bebas Linear, 2025–present. Guest host since 2020. Cohosted more than 40 podcast episodes in Bahasa Indonesia on various mathematical topics.
- **Founder**, morfID, 2024-present. A mathematical blog in Bahasa Indonesia focusing on undergraduate-level mathematics. Writers on ennumerative combinatorics and number theory blog posts, and social media handler.
- **Coordinator**, Mathematical Reading Group "Bongkar Meja", 2023–present. Hosting six mathematical paper reading group in Bahasa Indonesia.
- **Co-founder**, Pure Mathematics Society at ITB "Purist MA LOL", 2018–present.
- **Co-founder**, Competitive Mathematics Society at ITB "Banceng Club", 2018–present.
- **Assistant**, Indonesia International Mathematical Olympiad Training Camp, 2017-present.
- **Coordinator**, Domain Expansion HIMATIKA ITB, 2025-2026. Hosting two reading groups on "Proofs from the BOOK" with second and third year mathematics undergraduates in ITB.
- **Head of Mathematics Cluster**, INDERA (Indonesian Network of Doctoral and ECR in Australia), 2024-2026.
- **Mathematical writer**, Spearhead Circle, 2023–2026. Main works include three mathematical pop-culture books on calculus, statistics and linear algebra in Bahasa Indonesia. Samples available here.
- **Marker**, Simon Marais Mathematics Competition, 2023-2025.

- **Observer B for Indonesia**, International Mathematical Olympiad 2025, Sunshine Coast, Australia.
- **Commitee**, UNSW School of Mathematics & Statistics Postgraduate Conference, 2024.
- **Coordinator**, Community of Indonesian PhD Student at UNSW, 2023-2024.
- **Observer A for Indonesia**, International Mathematical Olympiad 2021, St. Petersburg (held online).
- **Head of Competitions**, MCF HIMATIKA ITB 2019.
- **Head of Media, Communication, and Information**, Pop Culture Enthusiast Club "Genshiken" ITB, 2018-2019.
- **Head of Internal**, Literary Club "Lingkar Sastra" ITB, 2017-2018.

MEDIA APPEARANCES

- Interviewed at Podcast Bebas Linear, 2026. In Bahasa Indonesia.
- Appeared at Nihongo Mantappu YouTube channel's UNSW tour, 2025. In Bahasa Indonesia.
- Guest speaker, RRI Programa 1 Banjarmasin, 2025, link and news report 1 and 2. In Bahasa Indonesia.
- Guest of PhD Youtube podcast by Shofia Ishar, 2024, part 1 and part 2. In Bahasa Indonesia.
- Interviewed as an AMSI Grant Awardee for AMSI Summer School 2023.

OTHER SKILLS

Languages: Bahasa Indonesia (native), Basa Banjar (native), English.
Technical Skills: LaTeX, Python, Photoshop, MATLAB, Microsoft Office, Discord

Last update: November 11, 2026.