

ELDHO K. THOMAS (DR.)

Department of Mathematics, Newman College, Thodupuzha, Kerala, India, 685585

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EDUCATION

- Ph.D. in Mathematical Sciences** Aug 2010- March 2015
Nanyang Technological University(NTU), Singapore
(2023 QS University Ranking: 19, World's best young university)
Specialization: Algebra and Coding Theory
Thesis title: Quasi-Uniform Codes and Information Inequalities Using Group Theory
Supervisor: Prof. Frédérique Oggier
- M.Sc. in Mathematical Sciences** Sep 2008-Dec 2009
Pure Mathematics Stream
University of Liverpool, United Kingdom
Distinction with 82 %
- M.Sc. in Mathematics** Aug 2006- May 2008
St.Thomas College, Pala
Mahatma Gandhi University, Kerala, India
Distinction with 84 %
- B.Sc. in Mathematics** July 2003- April 2006
St.Thomas College, Pala
Mahatma Gandhi University, Kerala, India
First class with 90%

EXPERIENCE

- Assistant Professor in Mathematics** Dec 2020 - Present
Department of Mathematics
Newman College, Thodupuzha
(Mahatma Gandhi University, Kerala,India)
- Research Fellow at University of Tartu, Estonia** Sept 2016 - Dec 2020
Institute of Computer Science
Supervisor: *Prof. Vitaly Skachek*
Research Area:
 1. Batch Codes and PIR Codes: Theoretical constructions and analysis of batch codes and private information retrieval(PIR) codes using techniques from algebra and graph theory.
 2. Batch Codes and PIR Codes: Theoretical constructions and analysis of batch codes and private information retrieval(PIR) codes using techniques from algebra and graph theory.
 3. Locally Repairable Codes (LRC): Computing classical coding theoretical bounds for LRCs.
- Research Fellow at National University of Singapore** Sept 2015 - Sept 2016
ECE Department
Supervisor: *Prof. Vincent Y.F. Tan*
Research Area: Polar Codes for Deletion - Proposing constructions of polar codes for binary erasure channels with random deletions.
- Graduate Student at NTU, Singapore** Aug 2010 - March 2015
School of Physical and Mathematical Sciences
Supervisor: *Prof. Frédérique Oggier*
Research Area:
 1. Quasi-uniform codes: Explicit constructions of quasi-uniform codes using finite groups and propose their applications in distributed storage.
 2. Information inequalities: Analyzing information inequalities using group theory.

COURSES TAUGHT

1. NEWMAN COLLEGE, THODUPUZHA (M.G. UNIVERSITY, KERALA, INDIA)

Graduate Courses

- ME010105: **Graph Theory**, an advanced level course for M.Sc. Mathematics, Semester 1, 2020, 2021, 2022, 2023.
- ME010205: **Measure and Integration**, an advanced level course on Real Analysis for M.Sc. Mathematics, Semester 2, 2021, 2022, 2023, 2024.
- ME010302: **Partial Differential Equations**, an advanced level course for M.Sc. Mathematics, Semester 3, 2022, 2023, 2024.
- ME800403: **Combinatorics**, an advanced level course for M.Sc. Mathematics, Semester 4, 2024.

Undergraduate Courses for Mathematics Major

- MM1CRT01: **Foundation of Mathematics**, A foundational course on sets, functions, relations, Boolean logic and theory of equations, Semester 1, 2021, 2022, 2023.
- MM2CRT02: **Analytic Geometry, Trigonometry and Differential Calculus**, An introductory course, Semester 2, 2021, 2022, 2023.
- MM3CRT03: **Calculus**, An intermediate level course on calculus, Semester 3, 2021, 2022.
- MM4CRT04: **Vector Calculus, Theory of Numbers and Laplace Transform**, An introductory course on number theory, Fourier transform, Laplace transform and vectors, Semester 4, 2021, 2022, 2023.
- MM6CRT04: **Abstract Algebra**, An intermediate level course on abstract algebra, Semester 5, 2023.
- MM6CBT01: **Operations Research**, An intermediate level course on linear programming, optimization techniques and game theory, Semester 6, 2022.
- MM6CRT02: **Graph Theory and Metric Spaces**, A basic course on graph theory and topology, Semester 6, 2022, 2023.

Undergraduate Courses for Non-Mathematics Major

- MM1CMT01: **Partial Differentiation, Matrices, Trigonometry and Numerical Methods**, An introductory course for Science stream students, Semester 1, 2020.
- MM1CMT02: **Integral Calculus and Differential Equations**, An introductory course on calculus for Science stream students, Semester 2, 2021, 2022, 2023.
- MM3CMT03: **Vector Calculus, Analytic Geometry and Abstract Algebra**, An introductory course on calculus for Science stream students, Semester 3, 2021.
- MM4CMT04: **Fourier Series, Laplace Transform and Complex Analysis**, Semester 4, 2021, 2023.
- MM5GET02 : **Applicable Mathematics**, A basic course on elementary mathematics for competitive examinations targeting students from Arts, Commerce and Science streams, Semester 5, 2021, 2022.

2. UNIVERSITY OF TARTU, ESTONIA

- **Design and Analysis of Algorithms**, an advanced level course on algorithms for Masters students, Frontline Teaching, grading quizzes and assignments, Autumn 2020, 2018.
- **Introduction to Coding Theory**, an advanced level course on coding theory for Masters students, Frontline Teaching, grading quizzes and assignments, Autumn 2019.
- **Introduction to Theoretical Computer Science**, an introductory course on logic and automata for undergraduate students, Frontline Teaching, grading quizzes and assignments, Winter 2019.

3. NANYANG TECHNOLOGICAL UNIVERSITY, SINGAPORE

- **Mathematics 1**, an introductory calculus course for undergraduate Engineering students, Frontline Teaching, grading quizzes and assignments, August - December 2013.
- **Calculus 2**, an advanced level course of calculus for undergraduate Science stream students, Frontline Teaching, grading quizzes and assignments, January - May 2013, January- May 2012.
- **Calculus 1**, an introductory calculus course for undergraduate Science stream students, Frontline Teaching, grading quizzes and assignments, August - December 2012.

PUBLICATIONS

Journal Publications

- “Batch Codes for Asynchronous Recovery of Data”, A. Riet, V. Skachek and E.Thomas, IEEE Transactions on Information Theory, Volume 68, Issue 3, March 2022.
- “Polar Coding for the Binary Erasure Channel with Deletions”, E.Thomas, V.Tan, A.Vardy and M.Motani, IEEE Communications Letters, Volume 21, No.4, 2017.
- “On Group Violations of Inequalities in Five Subgroups”, N.Markin, E.Thomas and F.Oggier, Advances in Mathematics of Communications, Volume 10, No.4, 2016.
- “Abelian Group Representability of Finite Groups”, E.Thomas, N.Markin and F.Oggier, Advances in Mathematics of Communications, Volume 8, No.2, 2014.

Conference Proceedings

- “Asynchronous Batch and PIR Codes from Hypergraphs”, A. Riet, V. Skachek and E.Thomas, Information Theory Workshop (ITW), Guangzhou, China, 2018.
- “Constructions and Bounds for Batch Codes with Small Parameters”, E.Thomas and V.Skachek, 5th International Castle Meeting (ICMCTA), Vihula, Estonia, 2017.
- “Applications of Quasi-uniform Codes to Storage”, E.Thomas and F.Oggier, International Conference on Signal Processing and Communication (SPCOM), Bangalore, India, 2014.
- “Groups and Information Inequalities in 5 Variables”, N.Markin, E.Thomas and F.Oggier, Allerton Conference on Communication, Control, and Computing, Illinois, USA, 2013.
- “Explicit Constructions of Quasi-Uniform Codes from Groups”, E.Thomas and F.Oggier, International Symposium on Information Theory (ISIT), Istanbul, Turkey, 2013.
- “A Note on Quasi-Uniform Distributions and Abelian Group Representability”, E.Thomas and F.Oggier, International Conference on Signal Processing and Communication (SPCOM), Bangalore, India, 2012.

RESEARCH INTERESTS

- Classical coding theory problems using techniques from abstract algebra and graph theory.
- Erasure coding for distributed storage systems.
- Applications of group theory to information theory.
- Coding for insertion and deletion channels.
- Other interesting algebraic and combinatorial problems which have potential applications in coding theory and information theory.

TALKS AND SEMINARS

- “Mathematics in Modern Life”, Association Inaugural Lecture, St. Joseph’s College, Moolamattom, Kerala, India, August 2023.
- “An Introduction to Coding Theory” Ramanujan Day Lecture, Nirmala College, Muvattupuzha, Kerala, India, 20 December 2022.
- “Batch Codes for Cloud Storage: An Overview”, International Seminar on Recent Trends in Applied Mathematics, KSMD College, Sasthamcotta, Kerala, India, May 2021.
- “Asynchronous Batch Codes: An Introduction” International Seminar on Recent Trends in Mathematics and Some Applications, Ettumanoorappan College, Kerala, India, Feb 2020.
- Joint Estonian-Latvian Theory Days, Parnu, Estonia, March 2019.
- 24th Estonian Winter School in Computer Science, Palmse, Estonia, March 2019.
- “Constructions and Bounds for Batch Codes with Small Parameters”, Institute of Computer Science, University of Tartu, Estonia, July 2017.
- “Batch Codes and PIR Codes: An Introduction” International Seminar on Algebra and Coding Theory (INSACT), St. Berchmans College, Changanassery, Kerala, India, Feb 2017.
- “Group Theoretic Construction of Quasi-Uniform Codes”, Joint Estonian- Latvian Theory Days, Lilaste, Latvia, Oct 2016.
- “Quasi-Uniform Codes and Ingleton Inequalities Using Group Theory”, ECE, NUS, Singapore, May 2015.
- “Applications of Quasi-Uniform Codes to Storage”, International Conference on Signal Processing and Communications, ECE, Indian Institute of Science, India, July 2014.
- “Explicit Constructions of Quasi-Uniform Codes from Groups”, International Symposium on Information Theory (ISIT), Istanbul, Turkey, July 2013.
- “A Note on Quasi-Uniform Distributions and Abelian Group Representability”, International Conference on Signal Processing and Communication (SPCOM), ECE, Indian Institute of Science, India, July 2012.

TRAINING PROGRAMMES/WORKSHOPS ATTENDED

- ”Research Based Pedagogical Tools (RBPT)”, 4 Days Workshop, Newman College, Thodupuzha, 28-31 August 2022.
- “Advanced Research Methodology”, 2 Weeks Refresher Course, Teaching Learning Centre, Ramanujan College University of Delhi, 21 June - 05 July, 2022.
- ”Research Methodology”, 2 Weeks Refresher Course, Teaching Learning Centre, Ramanujan College University of Delhi, 21 Sept - 05 October, 2021.
- “Faculty in Universities/Colleges/Institutes of Higher Education”, 4 Weeks Faculty Development Programme, Teaching Learning Centre, Ramanujan College University of Delhi, 21 August - 19 Sept, 2021.

GRANTS AND AWARDS

Mobilitas Plus Postdoctoral Researcher Grant

Estonian Research Council

Project: Study of Novel Codes for Problems in Distributed Systems

Duration: Sept 2017-Sept 2019

Amount: 63420 EUR

NTU Research Scholarship

Nanyang Technological University, Singapore

Project: Doctoral Research

Duration: Aug 2010- Aug 2014

Amount: Tuition fees and monthly stipend (\cong 150,000 SGD)

International Advancement Award

University of Liverpool, UK

Duration: Sept 2008- Dec 2009

Amount: Partial Tuition fees for M.Sc.

THESIS SUPERVISION

Masters Thesis

1. Anitta Elizabeth Varghese, *The Logistic Map*, M.G. University, India, 2023.
2. Sruthi L., *Convex Optimization*, M.G. University, India, 2023.
3. Gayathri Gopal, *Cyclic Codes*, M.G. University, India, 2023.
4. Anna Maria Soy, *Computational Geometry: An Algorithm and its Applications*, M.G. University, India, 2022.
5. Avani T.S., *A Study on the General Position Problems in Graph Theory*, M.G. University, India, 2022.
6. Bigi George, *A Study on Semi-Graphs*, M.G. University, India, 2022.
7. Athira Ajay, *Graph Labeling*, M.G. University, India, 2021.
8. Jewel Maria Jolly, *Hypergraphs*, M.G. University, India, 2021.
9. Sona Titus, *Modular Geometric Lattices*, M.G. University, 2021.
10. Sander Mikelsaar, *Empirical Study of Asynchronous Batch Codes*, University of Tartu, Estonia, 2019.

Bachelors Thesis

1. Alphin Biju, Aysha K S, Fathima Shaji and Ruhama Joseph, *An Introduction to Combinatorics*, M.G. University, India, 2023.
2. Alan Thomas, Kavya Thomas, Devika Jayan and G. Devanandana, *Chemical Graph Theory*, M.G. University, India, 2022.
3. Kripa Jananki Balachandran, Stephen Thankachan, Vindhuja Vijayan and Abhijith V. A, *Knot Theory*, M.G. University, India, 2022.
4. Ansiya Shajahan, Aswathy Rajan, Sreelakshmi Bhaskaran, Ajith Shyjo and Anjaly Sajeev, *Digraphs: An Introduction*, M.G. University, India, 2021.
5. Diya Daie, Kavya S. Nair, Fathima Hanan K.S., Meenakshi Aji and Sharath S. Mathew, *An Introduction to Vedic Mathematics*, M.G. University, India, 2021.

SKILLS

Languages: English (Fluent), Malayalam (Native), Hindi(Intermediate)

Computer Languages: Matlab (Intermediate), Maple (Beginner)

Tools: L^AT_EX, GAP

OTHER SCIENTIFIC IMPACT

Reviewer

Design, Codes and Cryptography

IEEE Transactions on Communications

IEEE Transactions on Information Theory

Advances in Mathematics of Communications

INSTITUTIONAL RESPONSIBILITIES

- **Diamond Jubilee Mega Exhibition “Newmaneeyam 2024”:** General Convener
- **Coordinator**
 1. International seminar on “Mathematics and Statistics: Unlocking the Future”
 2. International Webinar Series on Advances in Applied Mathematical Sciences, 2021
 3. Quiz Club
- **Institutions Innovation Council Member**

PERSONAL DETAILS

Full Name (as in Passport): Eldho Kuppamala Puthenpurayil Thomas

Nationality: Indian

Sex: Male

Age: 38

REFERENCES

1. Current Institution

Prof. Bijimol Thomas

Principal, Newman College, Thodupuzha, Kerala, India

principal@newmancollege.ac.in, +91 9961971552

2. Ph.D. Supervisor

Prof. Frédérique Oggier

Assistant Dean, College of Science,

Division of Mathematical Sciences

Nanyang Technological University, Singapore

frederique@ntu.edu.sg, +65 65132016

3. Postdoc Supervisor

Prof. Vitaly Skachek

Institute of Computer Science

University of Tartu, Estonia

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