

BIO - DATA

1. Name : **AMBAT VIJAYAKUMAR**
2. (a).Present Address : Emeritus Professor
Department of Mathematics
Cochin University of Science and Technology.
Cochin-682022
INDIA.
Tel : 0484-2577518, 0484-2862462
Fax:91-484-2577595
E-mails : vijay@cusat.ac.in
vambat@gmail.com
- 3 .Educational Qualifications : M.Sc. Mathematics, 1980 - II Rank
University of Cochin

P.G. Diploma in German, 1983
University of Cochin.

Ph.D. Mathematics, 1986
Cochin University of Science and Technology
- Title of Ph.D.Thesis : **STUDIES IN THE GEOMETRY OF THE DISCRETE PLANE**
- Name of the Supervisors : Prof. Wazir Hassan Abdi and
Prof. T. Thrivikraman
4. Fields of Interest : a) **Graph Theory**- self complementary graphs, metric graph theory, spectra and energy of graphs, graph operators and its dynamics, graph products, power domination problem, game domination and scale free networks.

b) **History of Mathematics** - evolution of concepts, **Mathematics Education -popularisation and talent search** at all levels.

5. Experience : Lecturer, Regional Engineering. College, Calicut, 1986 - 1988

Lecturer, Cochin University of Science and Technology, 1988 - 1995

Reader, Cochin University of Science and Technology, 1995 - 2003

Professor, Cochin University of Science and Technology 2003- 31 May 2018.

Emeritus Professor, Cochin University of Science and Technology, November 2018-

Administrative Experience : Honorary Director, Centre for Interdisciplinary Studies , CUSAT 1999- 2003.

Head , Department of Mathematics CUSAT, 2001- 2004 ; 2011- 2012.
May 2016 – September 2017.

Hon. Deputy Director, Inter University Centre for Kerala Legacy in Astronomy and Mathematics(IUCKLAM).

Hon. Deputy Director, Centre for Science in Society, CUSAT.

6 . Seminars / Conferences participation:

Invited talks in India : Since 2016 (selected only)

- a) Invited talk in the National Seminar on Information Theory and Communication, (100th birth Anniversary of Shannon) , Rajagiri School of Engineering and Technology, Cochin , 30th April 2016.
- b) Invited talk in the Special Symposium on Mathematics Education , 31st Annual Conference of Ramanujan Mathematical Society, Tiruchirappally, India, June 18-21, 2016.

- c) The Power Domination Problem in Graphs, International Conference on Theoretical Computer Science and Discrete Mathematics , Kalasalingam University, Krishnankoil, December 19-21, 2016.
- d) ‘What is happening in Mathematical Sciences ‘ Lead lecture in the Mathematical and Statistical Sciences Session, 29th Kerala Science Congress, Marthoma College, Thiruvalla. January 29, 2017.
- e) Resource Person, Azim Premji University- Ramanujan Math. Society Workshop for School Teachers, Chinmaya Vidyalyaya , Kannur, May 2017.
- f) ‘Median Problems in Graphs ‘ International Conference in Graph Theory and Networks, St.Xaviers College, Aluva, October30- November1, 2017.
- g) Some Network Topological Notions of the Mycielskian of a Graph, International Conference on Discrete Mathematics and its Applications to Network Science, BITS Goa, July 7-10,2018.
- h) Key Note Speaker, The changing face of Mathematics, National Level Workshop On Discovering the Art of Mathematics, Department of Mathematics, University of Kerala, 18th December 2018.
- i) ‘Excitements in Mathematics’ Lead lecture in the Mathematical and Statistical Sciences Session , 31st Kerala Science Congress, Fatima Matha National college, Quilon, February 3, 2019.

Membership of Academic Societies:

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|---|---|--------------------------------|
| • Indian Mathematical Society | - | Life Member (1985) |
| • Ramanujan Mathematical Society | - | Life Member(1987) |
| • Association of Mathematics Teachers of India | - | Life Member (1980) |
| • American Mathematical Society | - | Member (1994) |
| • Canadian Mathematical Society | - | Member (1999) |
| • Institute of Combinatorics and its Applications Canada | - | Fellow (FTICA) – (1999) |
| • Kerala Mathematics Teachers Association | - | Life Member (2001) |
| • Cryptology Research Society of India | - | Life Member(2006) |
| • Academy of Discrete Mathematics and Applications | - | Life Member (2006) |
| • Mathematical Association of America | - | Member (2007) |
| • Indian Science Congress Association | - | Life Member (2009) |

7. Visits and Presentations Abroad/other institutions:

- a) Visited Hungary under the Indo-Hungarian Cultural Exchange Programme of UGC during October **1994** and gave lectures at the Mathematical Research Institute of **Hungarian Academy of Sciences** and **Eotvos Lorand University, Budapest, Hungary**.
- b) Participated in the ‘School and Workshop on Approximate Solutions of Hard Combinatorial Problems’ held at the **International Centre for Mechanical Sciences, Udine, Italy** during 10-19, September **1996**.
- c) Visited the **Universities of Manitoba, New Brunswick, Newfoundland and Waterloo, Canada** during April - July **1999** for collaborative research and lectures.
- d) Invited talk on ‘Graph Convexity Spaces- Combinatorial Aspects’ AARMS Combinatorics Workshop, **Memorial University of Newfoundland, Canada, May 24-28, 1999**.
- e) Invited Talk on ‘Brunn’s Property for Graph Convexity Spaces’ Summer Meeting of the Canadian Mathematical Society, **Memorial University of Newfoundland, Canada, May 29- June 1, 1999**.
- f) Visiting Scientist at the **Indian Statistical Institute, Kolkata** during July-September, **2004** (during Sabbatical leave).
- g) Contributed talk in the joint International Conference of Taiwan Mathematical Society and American Mathematical Society, **Tunghai University, Taiwan** , 14-18, December **2005**.
- h) Presented a contributed paper ‘Reciprocal Graphs’ in the **International Congress of Mathematicians (ICM), Madrid, Spain, August 22 - 30, 2006**.
- i) Visiting Professor, **Simon Fraser University, Canada, May - June 2007**.
- j) Presented a paper ‘Teaching and Learning of Discrete Mathematics- Indian Scenario’ TSG-15 of the **International Congress on Mathematics Education (ICME -11)**, Monterrey, **Mexico**, July 6-13, **2008**.
- k) Invited Talk on ‘ Clique irreducible and weakly clique irreducible graphs-A Survey’ in the **First India- Taiwan Conference on Discrete Mathematics** , **National Taiwan University, Taipei, Taiwan**, November 9-12, **2009**.
- l) Visiting Professor, Department of Applied Mathematics and Institute for Theoretical Computer Science, **Charles University, Prague , Czech Republic** , August **2011**.
- m) Talk on ‘Graph Operators and Its Dynamics - Some Recent Studies’, Department of Applied Mathematics and Institute for Theoretical Computer Science, **Charles University, Prague, Czech Republic** , 18th August 2011.

- n) ‘Excitements and Applications of Mathematics’, Interactive session with students of **International School, Prague**, Czech Republic , 22nd August 2011.
- o) Presented a paper ‘ Power domination in some classes of Graphs’ , Eurocomb-11, **Eotvos Lorand university and Alfred Renyi Institute, Budapest**, Hungary, 29 August-2 September, **2011**.
- p) Participated as a Member of the Indian delegation, in the **International Congress on Mathematical Education (ICME-12)** ,Seoul, **S.Korea** during 8-15th July **2012**.
- q) Invited Talk in the Instructional workshop on Graph Theory and Interconnection Networks, **Tunghai University**, Taichung, **Taiwan**, 15-16, November, **2013**.
- r) Invited Talk in the Third India-Taiwan Conference on Discrete Mathematics, **National Chiao Tung University**, Hsinchu, **Taiwan**, 18-22 November, **2013**.
- s) **Participated in the International Symposium on Mathematics for Emerging Nations Achievements and Opportunities (MENAO) at Seoul, S.Korea on 13 August 2014 organised by International Mathematical Union(IMU).**
- t) Presented a contributed paper ‘Bondage number of product graphs’ in the **International Congress of Mathematicians (ICM)**, Seoul, **S.Korea**, **August 13 – 21, 2014**.
- u) **Invited talk on’ Mathematics to the Masses - Some Success Stories from India’, in the International Congress on Mathematics Education, Hamburg, Germany, July 24-31, 2016.**
- v) **Invited talk on ‘Power domination in graph products’ in the 5th India- Taiwan Conference on Discrete Mathematics, Tamkang University, Taiwan, 18-21 July 2017.**
- w) **Invited talk on ‘Distance Spectra of Some Graph Classes- A Survey ‘ in the 9th Slovenian International Conference on Graph Theory , Bled, Slovenia, 23-30 June 2019.**

8. Doctoral Students:

- a) B. Radhakrishnan Nair - Triangle Number in a Graph and Related Topics - Cochin University of Science and Technology (1995).
- b) K.S. Parvathy - Studies on Convex Structures with emphasis on Convexity in Graphs - Cochin University of Science and Technology (1997).
- c) M.S. Sunitha - Studies on Fuzzy Graphs - Cochin University of Science and Technology (2002).

- d) G. Indulal - Studies on the Spectrum and the Energy of Graphs - Cochin University of Science and Technology (2007).
- e) Aparna Lakshmanan,S. – Studies on Some Graph Classes - Cochin University of Science and Technology (2009).
- f) Manju K. Menon – Studies on Some Graph Operators and Related Topics- Cochin University of Science and Technology (2010).
- g) Seema Varghese – Studies on Some Generalizations of Line Graph and the Power Domination Problem in Graphs – Cochin University of Science and Technology (2011).
- h) Chitra, M.R - Some topics in graph products (Cochin University of Science and Technology (2014).
- i) Pravas K - Studies on the root graphs of some graph operators (Cochin University of Science and Technology (2017).
- j) Seethu Varghese – Studies on the power domination problems in graphs (Cochin University of Science and Technology (2017).
- k) Savitha Viswanathan – Studies on the Network Topological properties of some Graph Classes (Cochin University of Science and Technology) (2018).
- l) Anu Varghese – Studies on the Spectra and Energy of Adjacency and Distance Matrices of Graphs (Cochin University of Science and Technology)((2019).
- m) Tijo James- Studies on the Domination Game in Graphs (Cochin University of Science and Technology)(2020).
- n) On going: Rasila V.A. – Steiner Distance Problems .

9. Other Academic Activities:

- a) Reviewer : Mathematical Reviews of American Math.Society (1988 -), Zentralblatt Math (2006 -)
- b) Regional Coordinator, Indian National Mathematical Olympiad (National Board for Higher Mathematics, Department of Atomic Energy) (1990 – 2017).
- c) Centre Coordinator for the PG and Ph.D. scholarship exams of NBHM (-2017)
- d) Referee: Discrete Mathematics, Fuzzy Sets and Systems , Utilitas Mathematica, Algorithmica, Indian Journal of Pure and Applied Mathematics, Journal of Indian Mathematical Society etc.
- e) Mentor, INSPIRE (Department of Science and Technology , GOI) : NIT Calicut (December 2011), University of Kerala (May 2012), S.H. College , Thevara (January 2012, September 2012, January 2015), Devamatha College,Kuravilangad (July 2014), Srimad Andavan Arts and Science College, Trichy (February 2016, October 2016, November 2018), Noorul Islam University (October 2016), Central University of Kasaragod (December 2017, 2018) and SHE of DST.

Seminars Coordination : Selected Only (2010 -)

- **Convener, International Conference on Recent Trends in Graph Theory and Combinatorics, August 12-15, 2010, Cochin - A Satellite Conference of the International Congress of Mathematicians (ICM)-2010.**
- Regional Convener, National Initiative on Mathematics Education,(INSA and NBHM) , Southern Regional Conference, November 11-13, 2011, Cochin.
- Coordinator, National Instructional Workshop on Cryptology sponsored by CRSI, May 2013.
- PC Member, International Meet on Transnational Education, Kerala State Higher Education Council, 3-5, January, 2014.
- PC Member, CALDAM -2018, February, 12-17, IIT Guwahati, India
- PC Co-Chair, CALDAM - 2019, February 14-16, IIT Kharagpur.
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- **Member, Academic Programme Committee and Invited Speaker, 6th India-Taiwan Conference on Discrete Mathematics, IIT Varanasi, November 2019.**
- **Member, Topic Study Group 15 - Discrete Mathematics, International Congress on Mathematics Education -14, Shanghai, China, July 2021.**

Academic /Professional bodies:

- a) Board of Studies in Mathematics, Cochin University of Science and Technology (1992-1995, 2000-2004, 2004-2008, **Chairman : 2008-2012, 2013-2017, 2017-2021).**
- b) Academic Council of CUSAT (2001-2004, 2004-2006, 2006-2008, 2008-2012, 2012-2017, 2017-2021). **Member, Standing Committee of the Academic Council (2016-2021).**
- c) Vice Chairman - Academic Committee for CBCS courses, CUSAT (2016 - 18).
- d) Executive Council of the Ramanujan Mathematical Society (1998-2000, 2004-2006, 2006-2008, 2008-2010).
- e) Academic Secretary (Founder) : Kerala Mathematics Teachers Association (an association for school teachers. (2001- 2017). President : 2017-
- f) **Academic Secretary, Ramanujan Mathematical Society, India (2002-2004).**
- g) Academic Secretary, Academy of Discrete Mathematics and Applications (2008- 2010, 2010-2012).
- h) Member, Faculty of Mathematical Sciences, University of Delhi (2010-2013).
- i) **Member, Council of Indian Mathematical Society (2014-2017) .**
- j) Member, Executive Council, Association of Mathematics Teachers of India,(2014-

- k) Chairman, Azim Premji University-Ramanujan Mathematical Society programmes for teachers training.(2015-2019).
- l) **Member, Work Group on Higher Education, Kerala State Planning Board (2016).**
- m) **Member, Academic Programme Committee, 5th India- Taiwan Conference on Discrete Mathematics, July 2017, Tamkang University, Taiwan**
- n) Academic Advisor , International Conference on Graphs and Networks, October 2017, St. Xaviers College, Aluva, India.
- o) Resource person- Mathematical Olympiad Workshop, Jawahar Navodaya Vidyalaya, organized by JNV, Kottayam- 5th October 2017.
- p) **Member, Research Council of Kerala School of Mathematics, Calicut (2017-2021) .**
- q) **Vice President, Ramanujan Mathematical Society, India (2019-2022).**

Editorial :

- Member, Editorial Board, NBHM - RMS Mathematics News Letter (1999-2007).
- Member, Editorial Board, Resonance, Indian Academy of Sciences(2007- 2011).
- Member, Editorial Board, TEJUS- News Letter of CUSAT (2001-2015)
- Member, Editorial Board, ANANTHATHA- A Mathematics Magazine in Malayalam.
- **Consultant, Ananthathe Arinja Aal , Malayalam translation of ‘The Man Who Knew Infinity’, by Robert Kanigal, published by Kerala Language Institute.August 2013.**

10. Publications:

a) Papers :

- 1.
32. Forwarding indices and bisection width of Sierpinski graphs.(with Savitha K S), Bull ICA (2016).
33. Convex Median and Anti-Median at Prescribed Distance (with Pravas, K.), Journal of Combinatorial Optimization, 33 , (2017), 1021-1029 .
34. Component factors of the Cartesian product of graphs,(with Chitra, M.R.) Asian-European Journal of Mathematics, (2016).
35. The diameter variability of product graphs,(with Chitra , M.R.), The Journal of Combinatorial Mathematics and Combinatorial Computing,(2016).
36. Heredity for generalised power domination (with Paul Dorbec, Seethu Varghese), Discrete Mathematics and Theoretical Computer Science, 18(3), 31-37, (2016).

37. Some network topological notions of the Mycielskian of a graph (with K S Savitha), AKCE International Journal of Graphs and Combinatorics (2016).
38. Reciprocal Graphs (with G. Indulal), Malaya J.Mat.4,(2016), 380-387.
39. Generalised power domination in WK- Pyramid networks, (with Seethu Varghese) , Bull ICA, Vol 78, (2016), 52-68.
40. On the Power domination Number of Graph products, (with Seethu Varghese), LNCS(Springer), Vol. 9602 (2016) , 357- 367.
41. The k- power bondage number of a graph (with Seethu Varghese), Discrete Mathematics, Algorithms , Applications., Vol 8, No: 4 (2016).
42. On an edge partition and root graphs of some classes of line graphs (with Pravas. K) , Electronics Journal of Graph theory and Its Applications, 1-15, 2017 .
43. Some diameter notions of the generalised Mycielskian of a graph (with K.S. Savitha, Chitra M. R.) , Proceedings of the International Conference on Discrete Mathematics and Theoretical Computer Science, Kalasalingam University, December 2016. LNCS (Springer), Lecture Notes in Comput. Sci., 10398, *Springer, Cham*, 371–382, 2017.
44. Further progress on the heredity of the game domination number (with Tijo James, Paul Dorbec), Proceedings of the International Conference on Discrete Mathematics and Theoretical Computer Science, Kalasalingam University, December 2016. LNCS (Springer), to appear in 2017.
45. The median problem on Symmetric Bipartite Graphs (with Pravas, K.), Proceedings of the International Conference on Discrete Mathematics and Theoretical Computer Science, Kalasalingam University, December 2016. LNCS (Springer), Lecture Notes in Comput. Sci., 10398, *Springer, Cham*, 262–270, 2017.
46. The diameter variability of the product graphs.(with Chitra M.R.), J. Combin. Math. Combin. Comput. 103 (2017), 159–170.
47. Power domination in Knodel graphs and Hanoi Graphs (with Seethu Varghese , A.M.Hinz), Discuss. Math. Graph Theory 38(1): 63-74 (2018) .
48. Distance Energy Change in bipartite graph due to edge deletion (with Wasin So and Anu Varghese), Linear Algebra and its Applications, 553 (2018),211-222.
49. The Domination Game on Split Graphs (with Tijo James and Sandi Klavzar), Bulletin of Australian Mathematical Society, doi:10.1017/S0004972718001053
50. Domination game: Effect of edge contraction and edge subdivision (with Tijo James) – Discuss. Math. Graph Theory,doi:10.7151/dmgt.2378.
51. Wiener index and Steiner 3-Wiener index of a graph (with Matjaž Kovšec, Rasila V. A.) – to appear in Asian European Journal of Mathematics 2021

52. Steiner Wiener index of block graphs (with Matjaž Kovše, Rasila V. A.) – AKCE. International Journal of Graphs and Combin. 17 (3) (2020), 830-840.

53. Split Graphs with Exactly Four Distinct Eigenvalues (with Anu Varghese, Steve Kirkland, Felix Goldberg), Disc..Appl. Math 2020.

54. On spectral radius of signed graphs without negative even cycles (with Z.Stanic)- Bulletin Mathematique de la Societe des sciences Mathematiques de Roumanie, Vol 64, (2021), 89-96.

55. Bounds on the Steiner Wiener index of graphs (with Rasila, V.A.)- communicated

56. Steiner Wiener index of line graphs (with Rasila, V.A)- communicated

Home page : ambatvijay.cusat.ac.in

h- index : 13

Google Scholar id: <https://scholar.google.co.in/citations?user=ei-GTVQAAAAJ&hl=en>

International Collaborations:

Under ‘Erudite’ Scheme of Kerala State Higher Education Council

- Daniella Ferrero, Texas State University, USA (2009).
- Paul Dorbec, University of Bordeaux, France (2013),.
- Andreas M Hinz, LMU, Munich, Germany(2014).
- Wasin So, San Jose University, USA(2016).

Other collaborations :

- Tao Ming Wang, Thunghai University, Taiwan.
- Steve Kirkland, University of Manitoba, Canada.
- Sandi Klavsar, University of Ljubljana, Slovenia.
- Matjas Kovse, IIT Bhubaneswar.
- Ivan Gutman,, University of Kragujevac, Serbia
- Zoran Stanic, University of Belgrade, Belgrade

b) Books :

2. **Recent Trends in Graphs and Combinatorics , Special Issue of Discrete Mathematics (Elsevier)-2012** . Eds ; R . Balakrishnan, R. B. Bapat, Sandi Klavsar, A.Vijayakumar, Thomas Zaslavsky, Xuding Zhu.
3. Proceedings of 5th International Conference, CALDAM 2019, February 14-16, IIT, Kharagpur, India, (Springer) LNCS 11394. Eds.: Sudebkumar Prasant Pal , Ambat Vijayakumar.
4. Proceedings of the INTERNATIONAL CONFERENCE ON NUMBER THEORY AND DISCRETE MATHEMATICS, SPECIAL ISSUE OF JOURNAL OF RAMANUJAN MATH SOCIETY, 2021. Eds: AMBAT VIJAYAKUMAR, MAHESH KAKDE, PRASAD TETALI, SANDI KLAVSAR, SANOLI GUN

c) Popular Articles : Selected only

In English :

4. **A Meeting with the Missile Man - An Interview with Dr. A.P.J. Abdul Kalam, Honourable President of India. Science India, November 2003.**
7. **In conversation with Prof C.R. Rao - A Polymath amongst Statisticians, Science India, April 2007.**
8. Srinivasa Ramanujan - Tribute to a Natural Genius, Science India, December 2008.
9. In conversation with a chaos consultant- Interview with Prof.. Robert Devaney, President, Mathematical Association of America, Science Reporter (NISCAIR-CSIR) November 2014.
10. An academic pilgrimage to Srinivasa Ramanujan's Kumbakonam, Science India, January 2015.
11. Sasthrayaan- A Unique project on quality science in Kerala, Science Reporter, (NISCAIR-CSIR) , February 2015.
12. Applications of Mathematics - Excitements and Challenges, Mathematics Teacher, February 2015.
13. **Homage to Dr. A P J Abdul Kalam- a Visionary Indian , Science India, April 2016.**
14. **In Conversation with Prof. Michael Barnsley, A Topologist turned Fractal Geometer, Science Reporter, (NISCAIR-CSIR), July 2017.**

In Malayalam:

1. On National Mathematics Year-2012, Field's Medal, Abel Prize, Olympiad etc in the Malayala Manorama year book 2013 (Malayalam). 407-413.
2. Prayogikatha Arinju Kanakku Padikkam(Let us learn mathematics knowing the applications, Horizon, Malayala Manorama, May 18, 2015.
3. Arbhudhavum Kanakkum Thammil (Mathematical Oncology) , Mathrubhumi Nagaram , November 10, 2017.
4. Masthishkavum Kanakkum Thammil (Brain Networks), Mathrubhumi, Nagaram, December 21, 2018.
5. Kadal kadannu padarnnoru indian dhishana- About Srinivasa Ramanujan, Mathrubhumi Weekly, April 26-May 2, 2020.
6. **Enpathinte niravil or bhauthika sasthranjan, Interview with Babu Joseph on his 80th birthday, Ezhuthu Magazine, August 2020.**
7. **Big datayude athikaayanu noorinte niravu, (Hundred years tribute to C R Rao) Kalakaumudi, Nov.22-29, 2020.**
8. **Mathai prabhavam- sasthrathilum, sammohyasasthrathilum- Mathew effect in Science, Ezhuthu Magazine, March 2021.**

Padhippura - a section for students in Malayala Manorama daily.

9. Laksham Laksham Kaaryangal (on Data Science and Big Data Analytics) - 28th December 2016 .
10. One plus one is one (in honour of George Boole on his 200th birth anniversary), 4th November 2015.
11. Kaalathinu Munpe (on Late Dr APJ Abdul Kalam) , 14 October 2015.
12. Internettile Ganitha Lokam (on GIMPS and OEIS), 12 June 2015

Other activities :

- Core team member, 'Sastrayaan' project of Sri. V D Satheesan MLA (2011-
- Core faculty, Cochin Olympiad of Cochin Diocese (2012-
- Member, Bharatiya Vidya Bhavan , Kochi Kendra Committee (2016-
- Life Member, Can Cure Foundation, Cochin (2017-

