



CURRICULUM VITAE

NAME : PAUL DEVASAHAYAM MANUEL

OCCUPATION : Professor,
Kuwait University, Kuwait

QUALIFICATION : 1992 ~ 1996 Ph.D.
University of Newcastle, Australia
1991 ~ 1992 M.S.
University of Saskatchewan, Canada
1981 ~ 1986 Ph.D.
Indian Institute of Technology, India

RESEARCH INTERESTS : Graph Algorithms, Chem-Informatics, Enterprise
Systems

ADMINISTRATIVE SKILLS : ABET Accreditation Process.

SOFTWARE SKILLS : Enterprise Resource Planning (ERP).

EDITORIAL BOARD : 1. International Journal of Cloud-Computing and Super-
Computing (IJCS)
2. Pure and Applied Mathematics Journal
3. International Journal of Extreme Automation and
Connectivity in Healthcare (IJEACH)

AREA EXPERT : IEEE ComSec eHealth Technical Committee (TC)

AWARD : 2010 – 2011 **Best Teacher Award**
Kuwait University, Kuwait.

2008 – 2009 **Distinguished Lecturer Award**
Kuwait University Center of Information Systems
(KUCIS).

2002 – 2003 **Industry Relationship Award**
KFUPM, Saudi Arabia.

ACCREDITATION EXPERTISE

Sept 2013 ~ Till date	Department Accreditation Coordinator Department of Information Science College of Computing Science & Engineering, Kuwait University, Kuwait
Mar 2009 ~ Sept 2012	Director Office of Assessment and Accreditation College for Women, Kuwait University, Kuwait
Aug 2009 ~ Dec 2010	ABET Accreditation of ISC Program Department of Information Science College of Computing Science & Engineering, Kuwait University, Kuwait
Aug 2003 ~ Dec 2004	ABET Accreditation of ICS Program Department of Information and Computer Science King Fahd University of Petroleum and Minerals, Saudi Arabia

EDUCATION

1992 – 1996	Ph.D.	Faculty of Engineering, University of Newcastle, Newcastle, Australia Major: Computer Science Thesis: Sequential and Parallel Algorithms on Balanced Graphs.
1991 – 1992	M. S.	Faculty of Engineering, University of Saskatchewan, Saskatoon, Canada Major: Computer Science Thesis: Sequential and Parallel Algorithms.
1981 – 1986	Ph.D.	Indian Institute of Technology, Madras, India Thesis: High speed computing.
1977 – 1979	M. Sc.	Madurai Kamaraj University, India Major: Mathematics THIRD RANK.
1973 – 1977	B. Sc.	Madurai Kamaraj University, India Major: Mathematics FIRST RANK.

WORK EXPERIENCE

Nov 2011 ~ Till date
Professor in Information Science
Dept of Information Science
College of Computing Science & Engineering,
Kuwait University, Kuwait

Aug 2014 ~ Till date
Conjoint Professor
Faculty of Science and Information Technology
University of Newcastle
Newcastle, NSW, Australia

Sept 2017 ~ Aug 2018
Director
MSIT
College of Graduate Studies, Kuwait University, Kuwait

Sept 2015 ~ Till Date
Coordinator
Assessment and Accreditation

Nov 2011 ~ Jun 2015
Director
MSIT
College of Graduate Studies, Kuwait University, Kuwait

March 2009 ~ Sept 2012
Director
Office of Assessment and Accreditation
College for Women, Kuwait University, Kuwait

March 2005 ~ Nov 2011
Associate Professor in Information Science
Dept of Information Science
College for Women, Kuwait University, Kuwait

Sept 2005 ~ Sept 2007
Acting Chairman
Dept of Information Science
College for Women, Kuwait University, Kuwait

Sept 2001 ~ February 2005
Associate Professor
Department of Information and Computer Science
King Fahd University of Petroleum and Minerals,
Saudi Arabia

June 2000 ~ Sept 2001
Project Manager
BITECH Software, Chennai, India

Sept 1998 ~ June 2000
Associate Professor, Department of
Computer Science, Applied Science University,
Jordan.

January 1996 ~ Sept 1998
Professor and Head,
Dept of Computer Applications
Madurai Kamaraj University, India.

WORKSHOP AND TRAINING

6 - 8 October 2013	Shaping the future of maths and science foundation, 6 th inGenious workshop in collaboration with the EPCA 47 th Annual Meeting, Berlin, Germany.
22 - 26 March 2011	Advanced training on Grid Computing organized by UNESCO-HP, HP South Africa, Pretoria, South Africa.
May 2010	“Training Course on Post Graduate Career”, AAIM International for Training and Development, Kuwait.
14 – 18 Dec 2009	“UNESCO-HP training in Grid Computing”, HP South Africa, Johannesburg, South Africa
15 – 19 March 2009	“Workshop on Bioinformatics”, Kuwait University, Kuwait

KU RESEARCH PROJECTS

Ongoing Projects:

Title of the Project	:	“Computational complexity of isometric path partition problems”
Funding Agency	:	QI 02/18, Kuwait University, Kuwait
Project Fund	:	KD. 3000
Duration	:	Dec 2018 – Dec 2019
Status	:	ongoing.
Investigators	:	Paul Manuel

Completed Projects:

Title of the Project	:	“Graph Theory General Position problem with Applications”
Funding Agency	:	QI 02/17, Kuwait University, Kuwait
Project Fund	:	KD. 3500
Duration	:	Dec 2017 – Dec 2018
Status	:	completed – Rated as “Excellent”.
Investigators	:	Paul Manuel and Sandi Klavzar

Title of the Project	:	“Geodetic problems with application in social networks”
Funding Agency	:	Kuwait University, Kuwait
Project Fund	:	KD 3500.
Duration	:	May 2016 – May 2017.
Status	:	completed - Rated as “Very Good”.
Investigators	:	Paul Manuel and Sandi Klavzar

Title of the Project	:	“Topological and physicochemical descriptors of Nano Structures”
Funding Agency	:	KFAS, Kuwait
Project Fund	:	KD 22000.
Duration	:	May 2013 – May 2014.
Status	:	completed - Rated as “Excellent”.
Investigators	:	Dr Thalaya Al-Fozan and Paul Manuel

Title of the Project	:	“Computational aspects of topological indices of molecular graphs” (WI 05/11)
Funding Agency	:	Kuwait University, Kuwait

Project Fund	:	KD 2500.
Duration	:	1 October 2011 – 30 September 2012
Status	:	Completed - Rated as “Good”.
Investigators	:	Paul Manuel
Title of the Project	:	“A practical approach of trust management system for cloud environment” (WI 07/11)
Funding Agency	:	Kuwait University, Kuwait
Project Fund	:	KD 3100.
Duration	:	16 March 2012 – 15 March 2013
Status	:	Completed - Rated as “Excellent”.
Investigators	:	Paul Manuel
Title of the Project	:	“Trust Monitoring System for Grid Computing” (WI 02/08)
Funding Agency	:	Kuwait University, Kuwait
Project Fund	:	KD 6850.
Duration	:	30 April 2009 – 29 April 2010
Status	:	Completed - Rated as “Very Good”.
Investigators	:	Paul Manuel and Mostafa Abd-El Barr
Title of the Project	:	“Topological Properties of silicate networks” (WI 01/07)
Funding Agency	:	Kuwait University, Kuwait
Project Fund	:	KD 6844.
Duration	:	December 2007 – April 2009
Status	:	Completed - Rated as “Excellent”.
Investigators	:	Paul Manuel and Kalim Qureshi
Title of the Project	:	“Empirical study of task partitioning, scheduling and load balancing strategies for heterogeneous distributed data parallel applications” (SM02/07)
Funding Agency	:	Kuwait University, Kuwait
Project Fund	:	KD 1500.
Duration	:	June 2007 – June 2008
Status	:	Completed - Rated as “Good”.
Investigators	:	Kalim Qureshi and Paul Manuel
Title of the Project	:	“Knowledge Based E-Governance Using Neural Network” (WI 04/05)
Funding Agency	:	Kuwait University, Kuwait
Project Fund	:	KD 6000.
Duration	:	September 2006 – March 2007
Status	:	Completed - Rated as “Excellent”.
Investigators	:	Paul Manuel and Mostafa Abd-El Barr

OTHER RESEARCH PROJECTS IN KUWAIT

Title of the Project	:	“Nanotechnology-based interconnection networks” UNESCO Ref Number is 3250039600 and KU Ref Number is XX06/09
Funding Agency	:	UNESCO-HP
Project Fund	:	US\$ 45, 000.
Duration	:	December 2009 – December 2012
Status	:	Completed
Investigators	:	Paul Manuel, Kalim Qureshi and Mohsen Guizani
Title of the Project	:	“Computational Chemical Graphs in Bioinformatics”
Funding Agency	:	Kuwait Foundation for the Advancement of Sciences (KFAS), Kuwait
Project Fund	:	KD 7, 500.
Duration	:	January 2010 – January 2011

Status : Completed - Rated as "Very Good"
Investigators : Ahmed Al-Kandari and Paul Manuel

CONFERENCES ORGANIZED

1. Convener, Technical Committee, 2nd International Conference on Computing Sciences and Engineering (ICCSE18), March 11-13, 2018, Kuwait University, Kuwait
2. Session Chair and Paper Presentation - 40 ACCMCC-2016, 12th — 16th December 2016, University of Newcastle, Australia. (<https://40accmcc.newcastle.edu.au/>)
3. Keynote Speaker - ICMCE 2016, 16th — 17th December 2016, VIT, Chennai, India (<http://chennai.vit.ac.in/files/icmce2016/>)
4. Program Committee, Distance in Graph 2016, 18 – 22, July 2016 in Ubud, Bali, 2016.
5. Program Chair, WORKSHOP ON UNESCO-HP BRAIN GAIN INITIATIVE, In Conjunction with: 2nd Kuwait Conf. on e-Services & e-Systems, Kuwait University, Kuwait, 5 – 7 April 2011
6. Joint Secretary, International Conference of Mathematics and Computer Science – ICMCS 2011, Chennai, India, January 7 – 8, 2011.
7. Joint Secretary, International Conference of Mathematics and Computer Science – ICMCS 2010, Chennai, India, February 5 – 6, 2010.
8. Session Chair, 5th IEEE GCC 2009 conference, Kuwait, March 16-19, 2009.
9. Co-chair, Technical Program Committee, ISTA 2009, Kuwait University, Kuwait.
10. Joint Secretary, International Conference of Mathematics and Computer Science – ICMCS 2009, Chennai, India, January 5-6, 2009.
11. Joint Secretary, International Conference of Mathematics and Computer Science – ICMCS 2008, Chennai, India, June 15-16, 2008
12. Member, 4th International Workshop on Graph labeling – IWOGL 2008, Harbin, China, January 7 – 10, 2008.
13. Joint Secretary, International Conference of Mathematics and Computer Science – ICMCS 2007, Chennai, India, March 1-3, 2007.
14. Key note speaker, Workshop on Graph Theory, Chennai, India, December 18 – 19, 2007.
15. Member, Program Committee, AWOCA 2006, Kings Canyon, Australia 2006.
16. Member, Program Committee, AWOCA 2005, Ballarat, Australia 2005.
17. Member, Scientific Committee, ICICS 2004, KFUPM, Dhahran, Saudi Arabia, 2004.
18. Member, Program Committee, AWOCA 2003, Hunter Valley, Australia 2003.
19. Member, Program Committee, WICS – 2002, KFUPM, Dhahran, Saudi Arabia, 2002.

TEACHING

I believe in teaching courses which focus on state-of-the-art technology. Now I teach the following courses:

1. Enterprise Resource Planning (ERP)
2. Information Technology and Social Media

I have lately built a software lab and developed a Lab Manual for Enterprise Resource Planning.

Students' Comments: Here are some of the students' comments in the instruction evaluation. "*One of the best teachers ever*", "*You are great doctor*", "*It is a privilege to study with Prof Paul Manuel*", "*Prof Paul is an example of how to deal with students fairly and professionally*", "*I learnt a lot from Prof Paul*".

Teaching Methodology: I got the best teacher award in 2010. I always strive to be as helpful to the students as possible. I enjoy interacting with students, other academics and people in general. I am considered as "easily approachable teacher" in our department.

ERP Expertise: I am an expert in the software of Enterprise Resource Planning which is the backbone of Information Systems Curriculum. The SAP is the most expensive software and we use freeware ODOO in the lab.

Availability: Students do not need any appointments to meet me. I make it a point that I reply to each email of each student instantly. This is how I respect the students.

Proactive Interests: I always show keen interests in the expansion of the department and the college. I and Dr Kalim Qureshi have proposed a new undergraduate program "BS in IT Multimedia".

My teaching experiences (at the undergraduate and graduate level) are:

1. Introduction to Software Engineering
2. Software Design (Rational suite)
3. Software Requirements Engineering (Rational suite)
4. Software Project Management
5. Web Services and Internet Technology – .NET Frameworks and J2EE
6. Computer Programming languages – C++, Java, C#
7. Parallel algorithms and Architecture
8. Computer Algorithms
9. Theoretical Computer Science
10. Discrete Structures
11. Database Systems
12. Health Informatics
13. Enterprise Resource Planning
14. Social Networks

RESEARCH

My area of research interests covers Graph Algorithms, Chem-Informatics, Enterprise Systems and Software Engineering.

Another research topic is related to the algorithmic issues of fixed interconnection parallel architectures. I have studied “Minimum Communication Cost Problem”, “Embedding Problem”, “Minimum Spanner Problem” and “Routing Problems” on various architectures such as hypercubes, butterfly, mesh of trees and mesh of arrays etc. My Ph.D. (computer science) thesis was on “Parallel algorithms and parallel architecture”. Prof. Mirka Miller (mirka@cs.newcastle.edu.au) and Prof. Peter Eades (peter@it.usyd.edu.au) were my Ph.D. supervisors. Some of the research papers were published in reputed journals such as Networks, Lecture Notes in Computer Science, Springer-Verlag, Ars Combinatorica, Discrete Mathematics, Discrete Applied Mathematics, Nordic Journal of Computing, Information Processing Letters, and Australian Journal of Combinatorics etc.

Our paper on “products of three triangular matrices” is quite significant. The previous well-known result to factorize an $N \times N$ matrix was in $O(N)$ triangular matrices. Our result reduces to three triangular matrices, which in turn reduces the time complexity of the problem from linear time to constant time. This is a bottleneck problem for the computation of Fourier transforms, Walsh transforms etc in Image Processing, and for the numerical computations in Differential Equations, Finite Element Methods etc. It means that many computational problems in Image Processing based on matrices that run in quadratic time are now automatically reduced to linear time. This paper is published in “Linear Algebra and its Applications” by Elsevier Science Inc, North Holland. One of the referees has commented “This is a break-through result in computational research”.

However, my significant research contribution is in graph theory with application in parallel interconnection networks and applied chemistry. We are one of the pioneers to explore chemical compounds such as silicate and carbon nanotubes from the perspectives of fixed interconnection networks using graph theory approach. Our recent UNESCO-HP project is on “Nanotechnology-based interconnection networks”. Molecular nanotechnology will be the ultimate manufacturing technology. It is expected that nanotechnology will revolutionize the computing, networking and telecommunication industries by producing faster and smaller non-silicon-based chipsets, memory, processors, and new-generation computers based on carbon nanotubes. The main objective of UNESCO-HP is to study the computational aspects of nanotechnology-based fixed interconnection networks.

My other research area is Chem-Informatics. The topological descriptor *Wiener index* named after the chemist Harold Wiener is defined as half the sum of the distances between every pair of vertices of a graph. So far, most of the researchers apply brute force method to compute Wiener index. There was no efficient unified technique discovered to compute Wiener index. This motivated Bojan Mohar and Tonia Pisanski to pose an open problem “is there an algorithm for general graphs that would calculate the Wiener index without calculating the distance matrix?” This open problem was posed in 1988 in [Journal of Mathematical Chemistry](#). It remained open until we solve this two-decade open problem. A partition strategy and use of embedding as a tool establish an elegant technique to compute Wiener index of certain classes of graphs without using distance matrix.

COMMUNITY SERVICE

CLICK-IT Club & Field Trips: I show a lot of interests in the extra-curricular activities of students. I arrange field trips every semester. I make it a point that I go with them to the field trips. I actively involve in all the activities of the department. I normally participate in all CLICK-IT activities. I attend all committee meetings, department seminars and exhibitions.

Seminars: I regularly give seminars in the department. I also give seminars in the department of computer science and computer engineering. My seminars are very popular in India and Australia too.

ABET Accreditation: I am the convener of Assessment & Continuous Improvement committee. I played key role in the ABET accreditation during the cycle 2009-10 and 2017-18. I have worked relentlessly in the preparation of ABET display room materials. The 2018-19 ABET Self-Study Report for the Information Sciences program at Kuwait University was selected for display of well-prepared Self-Study Reports at the 2019 ABET Symposium.

World University Ranking: When Prof Fawaz Al-Anzi was the Dean of CCSE, he assigned me the responsibility of “World University Ranking” in computing field. We invited Prof Haider Harmanani who is an expert in this field to visit our college. Under his guidance, we prepared a database in two categories: (1) Academicians (2) Employers in order to promote the Kuwait University and CCSE ranking.

UNESCO-HP Kuwait Workshop: I organized the UNESCO-HP Kuwait Workshop in Kuwait University as part of ICCSE2012.

MSIT: I was the MSIT program director for two terms. I wanted to do something more than the conventional duties. I encouraged MSIT thesis students to attend international conferences. Seven MSIT students attended an international Conference in Chennai, India during January 2018. They presented their works in “Ongoing Research and Open Problems” sessions. I arranged KFAS scientific mission grants for the Kuwaiti students. I sent one MSIT student to Lebanon under international student exchange program.

MSCIS: I voluntarily assisted the department chairman in the data collection of MSCIS market survey. I have prepared Course Description Forms (Detailed Syllabus) for different MSCIS courses.

PUBLICATIONS

According Google Scholar, the number of citations is 1353, i10-index is 40 and h-index is 20. According Thomson Reuters, the total impact factors of all my papers exceeds 70.

	Citations	Views	Readers	h-index	i10-index
Elsevier Dashboard	534	12 070			
Google Scholar	1514			21	41
Research Gate	1173	22 213			
Mendeley (Scopus)	801	17 494	660	16	

https://www.researchgate.net/profile/Paul_Manuel2

<https://scholar.google.com.au/citations?user=ip2nY0IAAAAJ&hl=en>

<https://kuniv.academia.edu/PaulManuel>

<https://www.mendeley.com/research-papers/?query=paul+manuel>

BOOKS CHAPTERS

- [1]. Paul Manuel, Macro and Micro Level Classification of Social Media Private Data, New Knowledge in Information Systems and Technologies, Advances in Intelligent Systems and Computing (AISC), Pages 853-866, volume 931, 2019, Springer Publications.
Springer, Germany
Scopus Indexed
- [2]. Belmir Patkovic, Kassem Saleh, and Paul Manuel, "SIMS: A Stakeholder Information Management System for Successful Projects", Advances in Intelligent Systems and Computing, PP 402-420, Volume 881, 2018, Springer.
Springer, Germany
Scopus Indexed
- [3]. R. Sundara Rajan, Indra Rajasingh, Paul Manuel, T. M. Rajalaxmi and N. Parthiban. *Embedding Circulant Networks into Butterfly and Benes Networks*, **Combinatorial Algorithms, Lecture Notes in Computer Science**, 2015
Springer, Germany
- [4]. Paul Manuel, Indra Rajasingh, R. Sundara Rajan, N. Parthiban, T. M. Rajalaxmi, *A Tight Bound for Congestion of an Embedding*, **Algorithms and Discrete Applied Mathematics, Lecture Notes in Computer Science** Volume 8959, 2015, pp 229-237.
Springer, Germany
- [5]. Paul Manuel, Indra Rajasingh, Bharati Rajan, and Joice Punitha, *Kernel in Oriented Circulant Graphs*, "Lecture Notes in Computer Science" Vol. 5874, pp. 396-407 (2009).
Springer, Germany.
- [6]. Paul D. Manuel, Bharati Rajan, Indra Rajasingh, and Amutha Alaguvel. *Tree Spanners, Cayley Graphs, and Diametrically Uniform Graphs*, "Lecture Notes in Computer Science" Vol. 2880, pp. 334-345 (2003).
Springer, Germany.

JOURNAL PUBLICATIONS

2019:

- [1]. Ali AlEnezi, Zainab AlMeraj and Paul Manuel, Challenges of IoT based new generation smart-government, *Journal of Informatics and Mathematical Sciences*, Accepted.
ISI Emerging Sources Citation Indexed

Paul Manuel, On the isometric path partition problem, **Discussiones Mathematicae Graph Theory**, 2020 Accepted.
De Gruyter Publications
ISI Impact Factor 0.302

2018:

- [2]. Paul Manuel, An efficient Hosoya Index Algorithm and its application, **International Journal of Computer aided Engineering and Technology**, 11(2), May 2018, DOI: 10.1504/IJCAET.2019.10018262
Inderscience Publication, Switzerland.
Scopus Indexed

- [3]. Sandi Klavžar, D. Azubha Jemilet, Indra Rajasingh, Paul Manuel and N. Parthiban, General transmission lemma and Wiener complexity of triangular grids, **Applied Mathematics and Computation**, 338 (2018) 115–122.
ISI Impact factor 1.6

- [4]. Paul Manuel and Sandi Klavzar, The graph theory general position problem on some interconnection networks, **Fundamenta Informaticae**, Volume 163, Issue 4, pp. 339-350, 2018. DOI 10.3233/FI-2018-1748
KU Project QI 02/17
European Association for Theoretical Computer Science, Rome, Italy
IOS Press
ISI 2018 Impact Factor is 0.725

- [5]. Paul Manuel and Sandi Klavzar, A general position problem in graph theory, **Bulletin of the Australian Mathematical Sciences Society**, Volume 98, Issue 2, pp. 177-187, October 2018.
KU Project QI 02/17
Cambridge University Press,
ISI 2017 Impact Factor is 0.482

- [6]. Sandi Klavzar and Paul Manuel, Strong geodetic problem in grid like architectures, **Bulletin of the Malaysian Mathematical Sciences Society**, Volume 41, Issue 3, pp 1671–1680, July 2018.
Springer Publications,

ISI 2016 Impact Factor is 0.720

2017:

- [7]. Paul Manuel, Sandi Klavzar, Antony Xavier, Andrew Arokiaraj and Elizabeth Thomas, Strong edge geodetic problem in networks, **Open Mathematics** (Formerly Central European Journal of Mathematics), Issue 1, Volume 15, pp 1225-1235, 2017.
ISI Impact factor: 0.682
- [8]. Paul Manuel, Sandi Klavzar, Antony Xavier, Andrew Arokiaraj and Elizabeth Thomas, Strong geodetic problem in networks, Accepted by **Discussiones Mathematicae Graph Theory**, 2018.
De Gruyter Publications
ISI Impact Factor 0.302

2016:

- [9]. Paul Manuel, D. Antony Xavier, S. Kulandai Therese, and Andrew Arokiaraj, A class of perfect domination problems on diamond lattices, **International Journal of Pure and Applied Mathematics**, Volume 109 No. 7 2016, 115-123.
Scopus Impact Factor 0.325
GS – NO, RS – NO
- [10]. Sandi Klavzar, Paul Manuel, MJ Nadjafi-Arani, R Sundara Rajan, Cyriac Grigorious, Sudeep Stephen, Average distance in interconnection networks via reduction theorems for vertex-weighted graphs, **The Computer Journal**, 59 (12), 1900-1910, 2016.
ISI Impact factor 0.89
- [11]. Mirka Miller, R. Sundara Rajan, R. Jayagopal, Indra Rajasingh and Paul Manuel, A note on the Locating-Total Domination in graphs, **Discussiones Mathematicae Graph Theory** Volume 37, Issue 3, 2017.
De Gruyter Publications
ISI Impact Factor 0.302
- [12]. A Detection for Patent Infringement Suit Via Nano Topology Induced by Graph, **Cogent Mathematics** (Taylor & Francis), 3: 1161129, 2016
- [13]. Indra Rajasingh, Paul Manuel, N. Parthiban, D. Azubha Jemilet, and R. Sundara Rajan, Transmission in Butterfly Networks, **The Computer Journal**, January 12, 2016.
ISI Impact factor 0.89

2015:

- [14]. Indra Rajasingh, R. Sundara Rajan and Paul Manuel, A Linear Time Algorithm for Embedding Christmas Trees into Certain Trees, **Parallel Processing Letters**, Volume 25, Issue 04, December 2015.
Scopus Impact Factor 0.499
- [15]. R. Sundara Rajan, Indra Rajasingh, Paul Manuel, Mirka Miller and T. M. Rajalaxmi, Maximum Incomplete Recursive Circulants in Graph Embeddings, **Discrete Mathematics, Algorithms and Applications**, Volume 07, Issue 04, December 2015.
- [16]. R. Sundara Rajan, Paul Manuel and Indra Rajasingh, Embedding between Hypercubes and Hypertrees, **Journal of Graph Algorithms and Applications (JGAA)**, Vol. 19, no. 1, pp. 361-373, 2015
Scopus Impact Factor 0.759
- [17]. Bader Ali, Abdullah Al Mutairi and Paul Manuel, "Paired Domination Problems of Infinite Diamond Lattice", **Journal of Combinatorial Mathematics and Combinatorial Computing**, Volume 92, pp. 3-13, 2015
Publisher: The Charles Babbage Research Centre, Winnipeg, Manitoba, Canada
Scopus Impact Factor 0.546
- [18]. Abdullah Al Mutairi, Bader Ali and Paul Manuel, "Packing in Carbon Nanotubes", **Journal of Combinatorial Mathematics and Combinatorial Computing**, Volume 92, pp. 195-206, 2015.
Publisher: The Charles Babbage Research Centre, Winnipeg, Manitoba, Canada
Scopus Impact Factor 0.546
- [19]. Indra Rajasingh, R. Sundara Rajan, Rajesh M and Paul Manuel, "Oriented Diameter of Grids", **Journal of Combinatorial Mathematics and Combinatorial Computing**, Volume 92, pp. 283-288, 2015.
Publisher: The Charles Babbage Research Centre, Winnipeg, Manitoba, Canada
Scopus Impact Factor 0.546
- [20]. Paul Manuel and A. S. Shanthi, Berge–Fulkerson Conjecture on Certain Snarks, **Mathematics in Computer Science**, 7, May 2015
Springer, Germany
Scopus Impact Factor 0.39
- [21]. Paul Manuel, Bharati Rajan, Cyriac Grigorious, Sudeep Stephen, On the Strong Metric Dimension of Tetrahedral Diamond Lattice, **Mathematics in Computer Science**, 07 May 2015
Springer, Germany
Scopus Impact Factor 0.39
- [22]. Sundara Rajan, Paul Manuel. Indra Rajasingh, Parthiban Natarajan and Mirka Miller, A Lower Bound for Dilation of an Embedding, **The Computer Journal**, April 1, 2015.

ISI Impact factor 0.89

2014:

- [23]. Cyriac Grigorious, Paul Manuel, Mirka Miller, Bharati Rajan, Sudeep Stephen, *On the metric dimension of Circulant and Harary graphs*, **Applied Mathematics and Computation**, Volume 248, 1 December 2014, Pages 47–54, Elsevier Publications.
ISI Impact factor 1.6
- [24]. Indra Rajasingh, Paul Manuel, A. S. Shanthi, *Excessive Index of Certain Nanotubes*, **Journal of Computational and Theoretical Nanoscience** 01/2014; 11(9).
ISI Impact factor 1.03
- [25]. Indra Rajasingh, Bharati Rajan, Paul Manuel, Joice Punitha, *Total - Kernel in Oriented Circular Ladder and Mobius Ladder*, **Ars Combinatoria** - 126: 337-349 (2016);
ISI Impact factor 0.2
- [26]. Bharati Rajan, Indra Rajasingh, Jude Annie Cynthia and Paul Manuel, *Metric Dimension of Directed Graphs*, **International Journal of Computer Mathematics**, Volume 91, Issue 7, pp. 1397-1406, 2014. Taylor & Francis Publication.
ISI Impact factor 0.577
- [27]. Thalaya Al-Fozan, Paul Manuel, Indra Rajasingh, and R. Sundara Rajan, *Computing Szeged Index of Certain Nanosheets Using Partition Technique*, **MATCH Communications in Mathematical and in Computer Chemistry**, Volume 72, pp. 339-353, 2014.
ISI Impact factor 1.83
- [28]. Thalaya Al-Fozan, Paul Manuel, Indra Rajasingh, and R. Sundara Rajan, *A New Technique to Compute Padmakar-Ivan Index and Szeged Index of Pericondensed Benzenoid Graphs*, **Journal of Computational and Theoretical Nanoscience**. Volume 11, Number 2, pp. 533-539, 2014.
ISI Impact factor 1.256, AMERICAN SCIENTIFIC PUBLISHERS.
- [29]. Paul Manuel, Indra Rajasingh and Arockiaraj, *Computing Total-Szeged Index of Nanostar Dendrimer NSC_5C_6* , **Journal of Computational and Theoretical Nanoscience**. Volume 11, Number 1, pp. 160-164, 2014
ISI Impact factor 1.256, AMERICAN SCIENTIFIC PUBLISHERS.

2013:

- [30]. Paul Manuel, Indra Rajasingh and Arockiaraj, *Total-Szeged Index of C_4 -nanotubes, C_4 -nanotori and Dendrimer Nanostars*, **Journal of Computational and Theoretical Nanoscience**. Vol 10, No 2, pp. 405-411, February 2013.
ISI Impact factor 1.256, AMERICAN SCIENTIFIC PUBLISHERS.

- [31]. Paul Manuel, Indra Rajasingh, Bharati Rajan and R. Sundara Rajan, *A New Approach To Compute Wiener Index*, **Journal of Computational and Theoretical Nanoscience** Vol 10, No 6, pp. 1515-1521, June 2013
ISI Impact factor 1.256, AMERICAN SCIENTIFIC PUBLISHERS.
- [32]. Indra Rajasingh, Paul Manuel, M. Arockiaraj, Bharati Rajan, *Embedding of circulant networks*, **Journal of Combinatorial Optimization**, Vol 26, No 1, pp 135-151, 2013;
ISI Impact factor 0.66. Springer Publications.
- [33]. Paul D. Manuel, Bharati Rajan, Indra Rajasingh, P. Vasanthi Beulah, *Improved Bounds on the Crossing Number of Butterfly Network*, **Discrete Mathematics & Theoretical Computer Science**, Vol 15, No 2 pp 87-94, 2013.
ISI Impact factor 0.465.
- [34]. Paul Manuel, *A trust model of cloud computing based on Quality of Service*, **Annals of Operations Research**, (2013): 1-12, April 24, 2013.
KU Project: WI 07/11
ISI Impact factor 1.217 (Q3), Springer Publications.
- [35]. Paul Manuel, Helal Al-Hamadi and Kalim Qureshi, *Challenges, strategies and metrics for supply-driven enterprises*, **Annals of Operations Research**, March 2013, (DOI) 10.1007/s10479-013-1346-z
ISI Impact factor 1.217 (Q3), Springer Publications.
- [36]. Paul Manuel, Indra Rajasingh and A. S. Shanthi, *Excessive Index of Certain Chemical Structures*, **International Journal of Pure and Applied Mathematics**. (IJPAM), vol. 84, No. 2 (2013).
Scopus Impact Factor 0.140, Academic Publications Ltd

2012:

- [37]. Paul Manuel, Indra Rajasingh, and R. Sundara Rajan, *Embedding variants of hypercubes with dilation 2*, **Journal of Interconnection Networks**, Volume 13, Issue 01n02, pp 1250004 (2012).
Scopus Impact Factor 0.388, World Scientific Publishing Co
- [38]. Indra Rajasingh, Michael Arockiaraj, Bharati Rajan and Paul Manuel, *Minimum wirelength of hypercubes into n -dimensional grid networks*, **Information Processing Letters**, Vol 112, No. 14-15, pp. 583-586, (2012).
ISI Impact factor 0.612, Elsevier Publications, Netherlands.
- [39]. Indra Rajasingh, Paul Manuel, Bharati Rajan and Arockiaraj, *Wirelength of hypercubes into certain trees*, **Discrete Applied Mathematics**. Vol 160 Issue 18, pp 2778-2786, (2012).
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TECHINICAL EXPERTISE

Languages : C, C++, JAVA, C#, COBOL

Middleware : Apache, MS-IIS, WebLogic

Databases : Oracle, MS-SQL Server, MS Access

Mark-up Languages : HTML, XML

Script Languages : VBScript, JavaScript

Case Tools : Rational Suite, MS-Projects

Internet Technology : .NET Frameworks

Functional Expertise : Enterprise Resource Planning – OpenERP/ODOO
