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Personal

Date of birth : *20th July, 1981* (Kanyakumari, India)

Age : *38*

Citizenship : *Indian*

Marital Status : *Single*

Education

B.E. (2003)
National Institute of Technology, Karnataka (NITK).
Electrical and Electronics Engineering
Dissertation: *Wireless power transmission using microwaves.*
Advisor: Dr. G.S. Punekar

M.Sc.(Engg) (2005)
Indian Institute of Science (IISc), Bangalore.
Electrical Engineering
Thesis: *Novel application of supervised and self organized neural network for stereo disparity estimation.*
Advisor: Prof. Y.V. Venkatesh

Ph.D. (2015)
Raman Research Institute (RRI), Bangalore.
Soft Condensed Matter Physics
Thesis: *Interplay between shape, order and topological defects: Elasticity of some soft condensed matter systems.*
Advisor: Prof. Yashodhan Hatwalne

Professional experience

- Trainee at **Mangalore Refinery and Petroleum Ltd (MRPL)**, Mangalore: Jun 2001
- Trainee at **Larsen and Turbo (L&T)**, Medical Equipment and Systems, Mysore: Jun 2002
- Consultant, **Qualitas Technologies**, Bangalore: Nov 2013 - Feb 2014.
- Research Associate
  RRI: Oct 2014 – Jan 2015.
  IISc: Feb 2015 – Aug 2015.

Post Doc. (2015-present)
Indian Institute of Science (IISc), Bangalore.
Department of Physics
Advisor: Prof. Rahul Pandit

Conferences/Workshops attended

1) SERC preparatory school in theoretical high energy physics, Centre for High Energy Physics, Indian Institute of Science, Bangalore, INDIA Oct 30 - Nov 18, 2006.
2) A short course on differential geometry by Prof. Juergen Ehlers, Inter- University Center for Astronomy and Astrophysics, Pune, INDIA Jan 2-22, 2007.
3) Workshop on Assembly, Organization and Propulsion in Complex systems, (AOPCS07), Indian Institute of Technology Madras, Chennai, INDIA Feb 22-24, 2007.
4) Workshop on Dynamical Systems, IISc Mathematics Initiative (IMI), Indian Institute of Science, Bangalore, INDIA Oct 22-Nov 03, 2007.
5) The Interface of Life (IOL), An International School on Biomembrane Physics, Indian Institute of Technology Madras, Chennai, INDIA Jan 07-18, 2008.
6) Bangalore Area Statistical Mechanics Meeting, Bangalore, INDIA Apr 12-1, 2008.
7) RRI school on Statistical Physics, Raman Research Institute, Bangalore, Mar 22 – Apr 03, 2010, Mar 07 - Mar 19, 2011, Mar 26 - Apr 07, 2012.
8) Conference and School on Nucleation, Aggregation and Growth, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, INDIA: (i) Conference: Jul 26 – 30 and (ii) School: Aug 1 - 6, 2010.
9) Unifying concepts in materials: J A Krumhansl school & symposium 2012, JNCASR, Bangalore, INDIA Jan 30 – Feb 08, 2012.
10) US-India Advanced Studies Institute on Thermalization: From Glasses to Black Holes, Indian Institute of Science, Bangalore, INDIA Jun 10-21, 2013.
11) Complex-Fluids (COMPFLU16), Indian Institute of Science Education and Research, Pune, INDIA Jan 2-4, 2016.
12) International workshop on the Economy as a complex system, The Institute of Mathematical Sciences, INDIA, Nov 13-14, 2017.
13) ICTS Distinguished Lectures on Machine Learning, International Center for Theoretical Science, INDIA, Feb 12-13, 2019.
14) Indian Statistical Physics Community Meeting, International Center for Theoretical Science, INDIA, Feb 14-16, 2019.

Talks/Posters

1) Invited talk on "***Artificial Neural Networks***", Jagadguru Sri Shivarathreeshwara Science and Technology University, Mysore, INDIA, Apr 30, 2006.
2) Poster on "***Tent morphology of polymer crystallites***", **Complex-Fluids (COMPFLU16),** Indian Institute of Science Education and Research, Pune, INDIA Jan 2-4, 2016.
3) Talk on "***Phases, morphologies, and transitions in a mathematical model for the endoplasmic reticulum***", **Indian Statistical Physics Community Meeting,** International Center for Theoretical Science, INDIA, Feb 14-16, 2019.

Academic visits

1) Observatoire de la Cote d'Azur, Nice, France, May 21 – Jun 8, 2018.

Publications

1) Y.V. Venkatesh, B.S. Venkatesh, A. Jaya Kumar, "**Stereodisparity estimation using a supervised neural network**", Machine Learning for Signal Processing, *Proceedings of the 2004 14th IEEE Signal Processing Society Workshop*, Brazil 2004, Sept. 29 - Oct. 1 Page(s): 785 – 793.

2) Y. V. Venkatesh, S. Kumar Raja, A. Jaya Kumar, "**On the application of a modified self-organizing neural network to estimate stereo disparity**", *IEEE Transactions on Image Processing* 16(11): 2822-2829 (2007).

3) A. Anitha, A. Jaya Kumar, R. Mascarenhas, A. Husain, "**Laser Guided Automated Calibrating System for Accurate Bracket Placement**", *Annals of Medical and Health Sciences Research*, 2015 Jan-Feb; 5(1): 42–44.

4) A. Jaya Kumar, Y. Hatwalne, M. Muthukumar, "**Stability of the sectored morphology of polymer crystallites**", *Phys. Rev. E 94*, 032506, Sept 2016.

5) A. Jaya Kumar, B. Chakrabarti, Y. Hatwalne, "**Elasticity of smectic liquid crystals with in-plane orientational order and dispiration asymmetry**", *Phys. Rev. E 95,* 022701, Feb 2017.

6) A. Jaya Kumar, B. Chakrabarti, Y. Hatwalne, "**Equilibrium of fluid membranes endowed with orientational order**", *Phys. Rev. E 95,* 042806, Apr 2017.

7) A. Jaya Kumar, Rahul Pandit, "**Science and Engineering Research in India (1985-2016): insights from two scientometric databases**", *Current Science 115(3),* Aug 2018.

In preparation:

8) A. Jaya Kumar, Y. Hatwalne, "**Classification of crystal structures and topological defects in graphene nanotori and fullerenes with high genus**".

9) M. Mahesh Kumar, A. Jaya Kumar, Rahul Pandit, "**Deep-learning assisted detection and termination of spiral and broken spiral waves in mathematical models for cardiac tissue**".

10) A. Jaya Kumar, Akhilesh Verma, Jeremie Bec, Rahul Pandit "**Path-planning smart swimmers in turbulent flows**".

11) A. Jaya Kumar, Akhilesh Verma, Jeremie Bec, Rahul Pandit "**Adversarial reinforcement learning for gravitaxis in turbulent flows**".

12) A. Jaya Kumar, Y. Hatwalne, Rahul Pandit "**Phases, morphologies, and transitions in a mathematical Model for the endoplasmic reticulum**".

13) Sai Chand, A. Jaya Kumar, Y. Hatwalne "**On the stability of line-defects in nematic order on fixed Topographies**".

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Research Interests

- Geometry and Topology in Physics.
- Machine Learning.
- Statistics.
- Soft-condensed matter.
- Statistical mechanics.
- Geometry in Computer Vision.

Courses graded

- **Computer vision** (E1 216) in 2004.
- **Advanced statistical mechanics** (PH 325) in 2016, 2017.
- **Modern topics in condensed matter** (PH 335) in 2017.

Computer Skills

Programming Languages: C, C++, Matlab, Mathematica, Surface Evolver, Blender, Python, QT, html, Latex.

Program developments: Android, Raspberry-Pi, artificial intelligence and image processing, robotics, 3D graphics, 2D and 3D game development, serial and parallel port interface, camera interface, Flash based webdesign and animation, data visualization.

Spoken languages

Tamil	Native	Spoken
English	12^{th} grade	Read, Write, Spoken
Kannada	12^{th} grade	Read, Write, Spoken
Hindi	12^{th} grade	Read, Write, Spoken
Tulu		Spoken

References:

Prof. Rahul Pandit
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C.V. Raman Road, Bangalore,
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Prof. Madan Rao
Theoretical Physics Group
Raman Research Institute
Sadashivanagar, Bangalore,
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email: madan@rri.res.in

Prof. Y. V. Venkatesh
ECE: Vision and Image Processing Laboratory
Department of Electrical & Computer Engineering
National University of Singapore
21 Lower Kent Ridge Road,
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Prof. Yashodhan Hatwalne
Soft Condensed Matter group
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Prof. Samuel Joseph
Theoretical Physics Group
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