

# Detailed Academic Vitae

**NAME** : **DR. PAVAN CHAKRABORTY**  
**Postal Address** : Office No 2207 Computer Center I,  
Indian Institute of Information Technology -Allahabad  
Deoghat, Jhalwa, ALLAHABAD -211 012, U.P., **INDIA**  
**E-mail** : [pavan@iita.ac.in](mailto:pavan@iita.ac.in), [pavan.chakraborty@gmail.com](mailto:pavan.chakraborty@gmail.com),  
[pavan@iucaa.ernet.in](mailto:pavan@iucaa.ernet.in)  
**Fax:** 0532-2430006 **Tel. No. :** 0532-2922121(O) **Mobile :** +91-9415014636  
0532-2922610(R)

**Present Designation:** Assistant Professor, IIIT - Allahabad,  
**Date and Place of birth:** 11 August 1968, Pondicherry (Puducherry)

## Educational Qualifications :

Degree	Year	Subject	Institution/University
Ph.D.	2001	Astronomy, Astrophysics	I.I.A.
M.Sc.	1993	Physics	I.I.T. -Kanpur
B.Sc.	1989	Physics, Astronomy, Mathematics	S.A.I.C.E.
Higher- Secondary	1986	Physics, Chemistry, Mathematics	S.A.I.C.E.

I.I.A. : Indian Institute of Astrophysics.

I.I.T. Kanpur : Indian Institute of Technology – Kanpur (U.P.)

S.A.I.C.E. : Sri Aurobindo International Center of Education, Pondicherry.

## Post-Doctoral Fellowship:

- **2001-2002** : Post-Doctoral Fellow at IIA for the ISRO RESPOND sponsored project “Modeling the Diffuse UV Radiation Field” for the Ultraviolet Imaging Telescope (UVIT) proposed to be launch as part of ASTROSAT, a multi-wavelength astronomy satellite.
- **2002-2004** : Post-Doctoral Fellow in the Instrumentation group at the Inter University Center for Astronomy and Astrophysics (IUCAA). Worked on instrumentation related to IUCAA 2m Telescope and developed the Exposure Time Calculations (ETC) for it and procedures for data reduction using IUCAA Faint Object Spectrometer and Camera (IFOSC).

**Ph.D. Thesis Title:** Investigations of Dust from Selected Comets.

*(Awarded the Best Ph.D. Thesis presentation at the XXI meeting of the Astronomical Society of India held at IUCAA, Pune, February, 2002.)*

**M.Sc. Project:** “Fabrication of a 200 Watts CO<sub>2</sub> Laser”.  
*(Awarded Best Project of the year in Physics)*

**Journal Referee:** Refried manuscripts for an international journal “*Earth & Planetary Sciences*”, 1014 AG Amsterdam, The Netherlands.



## Research Publications through:

<http://scholar.google.co.in> [as on Feb18, 2013]



Pavan Chakraborty

Indian Institute of Information Technology Allahabad

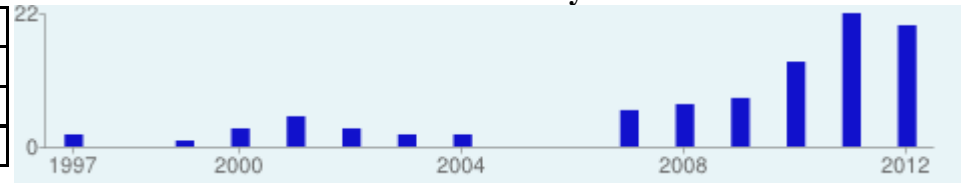
[Artificial Intelligence](#) - [Robotics & Instrumentation](#)

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### Citation indices

	All	Since 2008
<a href="#">Citations</a>	95	71
<a href="#">h-index</a>	7	6
<a href="#">i10-index</a>	3	1

### Citations to my articles



**h-index** is the largest number  $h$  such that  $h$  publications have at least  $h$  citations. The second column has the "recent" version of this metric which is the largest number  $h$  such that  $h$  publications have at least  $h$  new citations in the last 5 years.

**i10-index** is the number of publications with at least 10 citations. The second column has the "recent" version of this metric which is the number of publications that have received at least 10 new citations in the last 5 years.

	<a href="#">Title / Author</a>	Cited by	<a href="#">Year</a>
1.	<a href="#">Modeling of jets from comet Hale-Bopp (C/1995 O1): Observations from the Vainu Bappu observatory</a> R Vasundhara, <b>P Chakraborty</b> Icarus 140 (1), 221-230 <i>(Journal Impact factor: 3.816)</i>	<a href="#">21</a>	1999
2.	<a href="#">Development of Adaptive Modular Active Leg (AMAL) using bipedal robotics technology</a> GC Nandi, AJ Ijspeert, <b>P Chakraborty</b> , A Nandi Robotics and Autonomous Systems 57 (6-7), 603-616 <i>(Journal Impact factor : 0.633)</i>	<a href="#">12</a>	2009
3.	<a href="#">A model of the stellar radiation field in the UV</a> NV Sujatha, <b>P Chakraborty</b> , J Murthy, RC Henry Astronomical Society of India <i>(Journal Impact factor : 3.89)</i>	<a href="#">11</a>	2004
4.	<a href="#">A Central Pattern Generator based Nonlinear Controller to Simulate Biped Locomotion with a Stable Human Gait Oscillation</a> S Mondal, A Nandy, <b>P Chakraborty</b> , GC Nandi International Journal of Robotics and Automation (IJRA) 2 (2), 93	<a href="#">7</a>	2011
5.	<a href="#">Recognizing &amp; Interpreting Indian Sign Language gesture for Human Robot Interaction</a> A Nandy, S Mondal, JS Prasad, <b>P Chakraborty</b> , GC Nandi Computer and Communication Technology (ICCCT), 2010 International Conference ... IEEE Xplore Digital Library, pp. 712-717. [IEEE]	<a href="#">7</a>	2010
6.	<a href="#">A framework for synthesis of human gait oscillation using Intelligent Gait Oscillation Detector (IGOD)</a> S Mondal, A Nandy, A Chakrabarti, <b>P Chakraborty</b> , G Nandi In the proceeding of Springer, LNCS-CCIS 94, pp. 340-349 [Springer]	<a href="#">7</a>	2010
7.	<a href="#">Modeling Dust Jets And Shells From Comet Hale-Bopp</a> R Vasundhara, <b>P Chakraborty</b> , A Hänel, E Heiser Earth, Moon, and Planets 78 (1), 321-328 <i>(Journal Impact factor : 0.616)</i>	<a href="#">7</a>	1997

	<u>Title / Author</u>	Cited by	<u>Year</u>
8.	<a href="#">Recognition of isolated indian sign language gesture in real time</a> A Nandy, JS Prasad, S Mondal, <b>P Chakraborty</b> , GC Nandi Information Processing and Management, 102-107 [Springer]	<u>5</u>	2010
9.	<a href="#">Investigations of the Morphology of Dust Shells of Comet C/2001 Q4 (NEAT)</a> R Vasundhara, <b>P Chakraborty</b> , S Muneer, G Masi, S Rondi The Astronomical Journal 133, 612 ( <i>Journal Impact factor : 4.555</i> )	<u>5</u>	2007
10.	<a href="#">Investigations of the rotation pole from the morphology of dust fans of Comet 81P/Wild 2</a> R Vasundhara, <b>P Chakraborty</b> The Astrophysical Journal 616, 1278 ( <i>Journal Impact factor : 6.063</i> )	<u>4</u>	2004
11.	<a href="#">Classification of Indian Sign Language In Real Time</a> A Nandy, JS Prasad, <b>P Chakraborty</b> , GC Nandi, S Mondal International Journal on Computer Engineering and Information Technology ...	<u>3</u>	2010
12.	<a href="#">Exposure time calculator for IFOSC and sky background estimation</a> <b>P Chakraborty</b> , HK Das, SN Tandon Bulletin of the Astronomical Society of India 33, 513 ( <i>Journal Impact factor : 3.89</i> )	<u>2</u>	2005
13.	<a href="#">Gait Based Personal Identification System Using Rotation Sensor</a> S Mondal, A Nandy, <b>P Chakraborty</b> , GC Nandi Journal of Emerging Trends in Computing and Information Sciences 3 (3) PP. 395-402, Vol.3, No.3, March 2012.	<u>1</u>	2012
14.	<a href="#">Investigations of dust from selected comets</a> <b>P Chakraborty</b> (Ph.D Thesis) Indian Institute of Astrophysics, Bangalore	<u>1</u>	2001
15.	<a href="#">CCD observations of mutual events of Jovian satellites from VBO during 1997</a> R Vasundhara, <b>P Chakraborty</b> , M Appakutty, N Dinakaran, M Ganeshan, K ... Bulletin of the Astronomical Society of India 29, 511-518 ( <i>Journal Impact factor : 3.89</i> )	<u>1</u>	2001
16.	<a href="#">Occultation observation to probe the turbulence scale size in the plasma tail of comet Schwassmann-Wachmann 3-B</a> N Roy, PK Manoharan, <b>P Chakraborty</b> The Astrophysical Journal Letters 668, L67 ( <i>Journal Impact factor : 6.308</i> )		2007
17.	<a href="#">An Optical, Dual-Beam, Automated Medium Resolution Spectropolarimeter for the Vainu Bappu Telescope</a> <b>P Chakraborty</b> , R Vasundhara Experimental Astronomy 16 (2), 69-84 ( <i>Journal Impact factor : 2.140</i> )		2003
18.	<a href="#">ATOM-A Low-Cost Mobile Manipulation Platform for Research and Testing</a> A Makhal, M Raj, K Singh, R Singh, P Chakraborty, GC Nandi International Journal of Applied 4, 1-7		2012
19.	<a href="#">Path Planning through Maze Routing for a Mobile Robot with Nonholonomic Constraints</a> A.Makhal, Manish Raj, K.Singh, <b>P.Chakraborty</b> and G.C.Nandi 9th International Conference on Ubiquitous Robots and Ambient Intelligence (URAI) Deajeon, Korea 2012 [IEEE]		2012

	<a href="#">Title / Author</a>	Cited by	<a href="#">Year</a>
20.	<a href="#">Systematic Study of Binocular Depth Finding Using Two Web Cameras</a> S Krishna, S Kansal, A Makhal, <b>P Chakraborty</b> , GC Nandi Computer and Communication Technology (ICCCT), 2012 Third International Conference on .. [IEEE]		2012
21.	<a href="#">A study on human gait analysis</a> S Shahid, A Nandy, S Mondal, M Ahamad, <b>P Chakraborty</b> , GC Nandi <a href="#">CCSEIT '12</a> Proceedings of the Second International Conference on Computational Science, Engineering and Information Technology. [ACM]		2012
22.	<a href="#">'Robot-Cloud': A framework to assist heterogeneous low cost robots</a> R Doriya, <b>P Chakraborty</b> , GC Nandi Communication, Information & Computing Technology (ICCICT), 2012 ... [IEEE]		2012
23.	<a href="#">Tracking of a target person using face recognition by surveillance robot</a> S Kansal, A Makhal, <b>P Chakraborty</b> , GC Nandi Communication, Information & Computing Technology (ICCICT), 2012 ... [IEEE]		2012
24.	<a href="#">A study on damping profile for prosthetic knee</a> A Nandy, S Mondal, L Rai, <b>P Chakraborty</b> , GC Nandi Proceedings of the International Conference on Advances in Computing ... [ACM]		2012
25.	<a href="#">Tracking of Person using Monocular Vision by Autonomous Navigation Test Bed (ANT)</a> S Kansal, N Garg, <b>P Chakraborty</b> International Journal of Applied Information Systems (IJAIS) – ISSN : 2249 - 0868		2012
26.	<a href="#">Secure Migration of Tables across Different Database Management Systems over a Cross-Platform Environment</a> PK Murthy, S Agarwal, T Garbyal, <b>P Chakraborty</b> International Journal of Information and Electronics Engineering, Vol. 2, No. 3, May 2012		2012
27.	<a href="#">Recognizing Gestures for Humanoid Robot Using Proto-Symbol Space</a> N Kumar, SP Sahu, JP Maurya, GC Nandi, <b>P Chakraborty</b> Advanced Materials Research 403, 4769-4776		2012
28.	<a href="#">Development of a Robust Microcontroller Based Intelligent Prosthetic Limb</a> A Nandy, S Mondal, <b>P Chakraborty</b> , GC Nandi Contemporary Computing, 452-462 [Springer]		2012
29.	<a href="#">SMART-A Social Mobile Advanced Robot Test Bed for Humanoid Robot Researchers</a> J Shukla, JK Pal, FQ Ansari, GC Nandi, <b>P Chakraborty</b> Contemporary Computing, 463-470 [Springer]		2012
30.	<a href="#">A Cloud Based Robot Localization Technique</a> FQ Ansari, JK Pal, J Shukla, GC Nandi, <b>P Chakraborty</b> Contemporary Computing, 347-357 [Springer]		2012
31.	<a href="#">Gesture Recognition and Generation for HOAP-2 Robots by Fuzzy Inference System</a> R Doriya, P Agarwal, <b>P Chakraborty</b> , GC Nandi IEEE Computational Intelligence and Communication Networks (CICN), 2011 ... PP. 401-405. [IEEE]		2011

	<a href="#">Title / Author</a>	Cited by	<a href="#">Year</a>
32.	<a href="#">Modeling a Central Pattern Generator to Generate the Biped Locomotion of a Bipedal Robot Using Rayleigh Oscillators</a> S Mondal, A Nandy, C Verma, S Shukla, N Saxena, <b>P Chakraborty</b> , GC Nandi Contemporary Computing, 289-300 [Springer]		2011
33.	<a href="#">Dynamic Spectrum Derived Mfcc and Hfcc Parameters and Human Robot Speech Interaction</a> KK Sharma, P Kapoor, GC Nandi, <b>P Chakraborty</b> Int. Conf. on Advances in Computer Engineering 2011, ACEEE, PP.127-131 [ACEEE]		2011
34.	<a href="#">Face Detection by Fine Tuning the Gabor Filter Parameter</a> SP Sahu, V Anand, N Kumar, <b>P Chakraborty</b> , GC Nandi International Journal of Computer Science and Information Technologies (IJCSIT), Vol. 2 (6), 2719-2724.		2011
35.	<a href="#">Gesture based imitation learning for Human Robot Interaction</a> A Nandy, S Mondal, <b>P Chakraborty</b> , GC Nandi International Journal of Artificial Intelligence and Neural Networks, vol. 1, Issue 1, pp. 25-30, 2011.		2011
36.	<a href="#">Mobile Robot Localization using Single Camera Vision for Automated Test Bed by using DWT and HSI Color Model</a> P Kapoor, <b>P Chakraborty</b> , GC Nandi, V Agrawal Int. Conf. on Advances in Computer Engineering 2011 ACEEE, PP. 193-196		2011
37.	<a href="#">Graphical Driver Development Kit (GDDK) for Linux</a> K Anik, A Sharma, <b>P Chakraborty</b> International Journal of Computer Applications IJCA 1 (11), 12-15		2010
38.	<a href="#">Gesture recognition by stereo vision</a> JS Prasad, A Saxena, N Javar, KB Kaushik, <b>P Chakraborty</b> , GC Nandi Proceedings of the First ACM International Conference on Intelligent Interactive ... PP. 155-162		2010
39.	<a href="#">Designing A full Body Human Computer Interaction Device</a> AK Singh, AD Dhiwal, <b>P Chakraborty</b> , GC Nandi National Conference CSI-RDHS 2008 Research and Development in Hardware and Systems (CSI-RDHS 2008)		2008
40.	<a href="#">Spectropolarimeter for the Vainu Bappu Telescope</a> <b>P Chakraborty</b> International Symposium on Astrophysics Research and Science Education, p. 109. Vatican Observatory Foundation		1999
41.	<a href="#">Modeling Dust Jets and Shells from Comet Hale-Bopp A Cooperation of an Amateur Observatory and Professionals</a> <b>P Chakraborty</b> , E Heiser, A Haenel, R Vasundhara Astronomische Gesellschaft Meeting Abstracts 14		1998
42.	<a href="#">Photometry of Solar Corona to Study the Coronal Structures</a> <b>P Chakraborty</b> , K Sankarasubramanian, S Majumder, R Sridharan, AD Jana, G ... Indian Institute of Astrophysics, Bangalore, Kodaikanal Obs. 13, PP.69-74		1997

	Title / Author	Cited by	Year
43.	<a href="#">Observations of comet Shoemaker-Levy 9 from Japal-Rangapur Observatory</a> R Vasundhara, <b>P Chakraborty</b> , R Rajamohan, JC Bhattacharyya, G Som Sunder, P ... CURRENT SCIENCE, PP. 327-330, VOL. 68, NO.3, 10 FEBRUARY 1995 <i>(Journal Impact factor : 0.567)</i>		1995

*Dates and citation counts are estimated and are determined automatically by a computer program.*

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#### (a) Refereed International Journals : 15

#### (b) Refereed National Journals : 6

#### (c) Publications in Refereed Conference Proceedings: 20

#### (d) Other Refereed Publication not cited by Google Scholar

1. R. Vasundhara and **Pavan Chakraborty**. 1994.  
*(Astrometry of Comet Shoemaker Levy -9)* Minor Planet, Circular July. 1994
2. Abhishek Kumar Singh and **Pavan Chakraborty**, March **2010**, "Data Parallelization: GPU Vs Multicore" National Conference on Next Generation Computing NGC -10 held at Gurgaon Institute of Technology & Management, Gurgaon on March 20, 2010.
3. **Pavan Chakraborty**, 2006. "Bioresources from Astronomy – in Search of the Origin." International Conference on Current Trends in Algal Bioresource Utilization (ICCTABU – 2006), December 4 - 6, 2006. [Oral Presentation - 16]. Organised by Department of Ecology and Environmental Science, Assam University, Silchar -788 011, Assam India.
4. **Pavan Chakraborty** & R. Vasundhara.1994. "Observations of Comet Shoemaker Levy -9 from VBO". [Oral Presentation] The 16<sup>th</sup> Meeting of the Astronomical Society of India (ASI), meeting, Pune, Oct. 25–28, 1994.

#### (d) Papers Accepted but not yet Published.

- Anup Nandy, Soumabha Bhowmick, **Pavan Chakraborty**, G. C. Nandi, "Gait Biometrics: An Approach to Speed Invariant Human Gait Analysis for Person Identification" Accepted for publication in Springer AISC series, *2<sup>nd</sup> International Conference on Soft Computing for Problem Solving SOCPROS-2012 at J K Lakshmipat University, Jaipur on 28<sup>th</sup> to 30<sup>th</sup> Dec 2012.*
- Priyadarshi, Anup Nandy, **Pavan Chakraborty** and G. C.Nandi, "Speed Invariant, Human Gait based recognition System for Video surveillance security" Accepted for publication in Springer CCIS series, *2<sup>nd</sup> International Conference on Intelligent Interactive Technologies and Multimedia (IITM-2013) at IIIT-Allahabad, on March 9 -11 2013.*

#### (e) Papers under REVIEW:

- Anup Nandy, Soumabha Bhowmick, Saman Shahid, **Pavan Chakraborty**, G. C. Nandi "A Sensor based technique for Speed Invariant Human Gait Classification." Submitted to Advances in Intelligent and Soft Computing, Springer International Conference on Advanced Computing, Networking, and Informatics (ICACNI-2013) to be held at Department of Computer Science & Engineering Central Institute of Technology Raipur, Chhattisgarh
- Dwipayana Deb, Pavan Chakraborty and Jayan Murthy; "Verification of the Spectral Classification using the Hipparcos Catalog and Observed V magnitude", submitting to the *Monthly Notices of the Royal Astronomical Society*. **[Impact Factor: 4.9]**

## **(f) Other Publications : (Technical Reports, Reports and Monograph)**

1. **Pavan Chakraborty**, 2004. *Exposure Time Calculator, an Operational Manual*. January 2004.
2. **Pavan Chakraborty**, 2002. *Calibration Experiments with the Polarimetric Optics for IFOSC*, December 2002.
3. **Pavan Chakraborty**, R. Vasundhara, K. Ravi, P. Anbazagan, P. U. Kamat, S. V. Rao, A. Ramchandran, F. Gabriel, Sagayanathan, & V. K. Subramanian, 2001. *Technical Report and Manual for the Optical, Dual-Beam, Automated Medium Resolution Spectropolarimeter at the Vainu Bappu Telescope*
4. **Pavan Chakraborty**, R. Vasundhara, J. C. Bhattacharyya, R. Rajamohan and A. K. Saxena 1995. *Technical Report on Fabrication Planetary Coronagraph for the Vainu Bappu Observatory and Preliminary Observation with it.*
5. **Pavan Chakraborty**, 1994. *Observation of Comet Shoemaker-Levy 9 and its Crash on Jupiter*. Pre-Ph.D. report submitted at the Indian Institute of Astrophysics (IIA), Bangalore.
6. **Pavan Chakraborty**, 1992. *Fabrication of a 200 Watt CO<sub>2</sub> Laser*. M.Sc. project report submitted at the Dept. of Physics and Center for Laser Technology (CELT) at Indian Institute of Technology (IIT), Kanpur.
7. **Pavan Chakraborty**, 1990. *Cosmological Theories*. A Monograph made during B.Sc. at Sri Aurobindo International Center of Education, Pondicherry.

## **(g) Conference Presentations/Attendance:**

### **Invited talks:**

1. **Pavan Chakraborty** 2006. Symposium : “*Science & Technology Education in the North East: New Perspectives*”. A Symposium held on January 21, 2006 at Assam University, Silchar to commemorate the 13<sup>th</sup> Foundation Day Celebration of Assam University. [The other Eminent Speakers were: Prof. P. N. Srivastava, Former V.C. of JNU and Former member of Planning Commission; and Prof. P. K. Banik, Director, NIT, Silchar.]
2. **Pavan Chakraborty** 2002. “*Investigations of Dust from Selected Comets*”. Ph.D. Thesis presentation at the *XXI meeting of the Astronomical Society of India* held at the Inter University Center for Astronomy and Astrophysics (IUCAA), Pune, February 5-8, 2002. **(Awarded the Best Ph.D. Thesis presentation (2002).)**

### **Contributed Oral Presentations:**

1. **Pavan Chakraborty**, Pranab Bhattacharjee, 2006. *Water – A Proposal of Rain Harvesting at Assam University, Silchar* [Oral Presentation]. Workshop on Capacity building program on “Water Harvesting and Water Utilization” on March 25, 2006. Organized by Assam University, Silchar and sponsored by NERIWALM, Tezpur.
2. **Pavan Chakraborty** 2005. “*Cometary Dust – A Clue to Our Origin*”. Presented at the UGC Sponsored State Level Conference on “Recent Developments in Physical Science” from August 6-7, 2005. Organised by Department of Physics Karimganj Collage, Karimganj 788 710, Assam.
3. **Pavan Chakraborty** 2001. “*Cometary Dust in Our Solar System*”. Presented at the Workshop on “Meteorites, Asteroids and Planets”, held at Mt. Abu, India. Organised by Physical Research Laboratory. December 15-21, 2001.
4. **Pavan Chakraborty** 1998. *Spectropolarimeter for the Vainu Bappu Telescope* Presented at the International Symposium on Astrophysics Research And Science Education at The Vatican Observatory June 14-21 1998, Castel Gandolfo, Italy.
5. **Pavan Chakraborty**, K. Sankarasubramanian, Sonjoy Majumder, K. Rajesh Nayak, R. Sridharan, A. D. Jana, G. Rajalakshmi, D. Suresh, Ashish Asgekar, K. P. Geetha and Rajesh C. Kunnumpuram, 1996. “*White Light Images of the 1995 Total Solar Eclipse*”. Presented at the National Meeting on Total Solar Eclipse, of October 24, 1995. Organized by Indian Institute of Astrophysics from February 26-27, 1996.



6. **Pavan Chakraborty** & R. Vasundhara 1996. "A Data Reduction Technique to analyze Stellar Occultation by Dust around comet nucleus with results the Stellar Occultation around Fragments Q1 and Q2 of the Comet Shoemaker–Levy 9. An oral presentation at the One day National Symposium on the Dust in the Universe. Organized by Indian Institute of Astrophysics on 31st December 1996.
7. **Pavan Chakraborty** & R. Vasundhara 1997. *Stellar Occultation by Dust around comet nucleus with results the Stellar Occultation around Fragments Q1 and Q2 of the Comet Shoemaker–Levy 9*. Presentation at the Sixth Summer School in Observational Astronomy and Astrophysics, held at Castel Gandolfo, Rome, Italy from 8 June to 5 July, 1997.

### **Poster Presentations:**

1. **Pavan Chakraborty**, R. Vasundhara, 1998. *Spectropolarimetry of Comet Hale-Bopp* A poster presentation at the 19th Meeting of the Astronomical Society of India (ASI), (February 1st to 4th 1999), hosted by the Raman Research Institute, Bangalore, India.
2. **Pavan Chakraborty**, Andreas H<sup>ä</sup>nel, Erwin Heiser and R. Vasundhara, 1998. *Modeling Dust Jets and shells from Comet Hale-Bopp – A Cooperation of an Amateur Observatory and Professionals* (Astronomische Gesellschaft Meeting), A poster presentation at the Annual Scientific Meeting of the Astronomische Gesellschaft in Heidelberg from September 14th to 19th 1998, Poster No. P3.
3. **Pavan Chakraborty**, R. Vasundhara, 1998. *Spectropolarimeter at the Vainu Bappu Telescope* As a section of the poster on the Vainu Bappu Observatory at the 2nd *International Workshop on Solar Polarization*, (Oct 12–16, 1998). Hosted by the Indian Institute of Astrophysics, Bangalore, India.
4. R. Vasundhara, **Pavan Chakraborty**, Andreas H<sup>ä</sup>nel & Erwin Heiser. 1997. *Modeling Dust Jets and shells from Comet Hale-Bopp* Poster at *The First International Conference on Comet Hale-Bopp*, held at Tenerife, Spain.
5. R. Vasundhara, **Pavan Chakraborty** and K. Jayakumar, 1996. *Comet Hale-Bopp, Intensity Variation across the inner comma*. A poster presentation at the 17th Meeting of the Astronomical Society of India (ASI), at Guwahati, Jan. 1996.

### **Only Attendance : Conference and Seminars Attended :**

- 1 Symposium organized to commemorate the formal inauguration of the IUCAA 2m Telescope, held at IUCAA, Pune on May 12 to 13, 2006.
- 2 Sun, Stars and the ExtraGalactic Universe -a Symposium in celebration of M. K. Bappu's 75<sup>th</sup> birth anniversary, held at IIA Bangalore from August 8-10, 2002. (*Was part of the LOC* ).
- 3 The International Conference of Non-Accelerator Particle Physics (ICNAAP) held at the Indian Institute of Astrophysics during the period January 2-9, 1994. (*Was part of the LOC* ).

### **Summer Schools :**

1. Summer School in Astronomy and Astrophysics jointly held at the Inter University Center for Astronomy and Astrophysics and at the National Center for Radio Astrophysics, Pune, India; in June-July 1992.  
– Worked on understanding Self Calibration in Radio Astronomy with Prof. Pramesh Rao (NCRA).
2. SERC School on "Advanced Stages in Stellar Evolution" held at Vainu Bappu Observatory, Kavalur during January 31 to February 7, 1994. The school was organized by Indian Institute of Astrophysics and sponsored by DST.
3. The Sixth Summer School in Observational Astronomy and Astrophysics held at Castel Gandolfo, Rome, Italy from 8 June to 5 July, 1997. The topic of the school was Solar System studies, specifically on comets, asteroids and meteorites.

### **Seminars etc. Delivered at Other Institutions on Invitation:**

- 1 *Understanding Cloud Computing*. An invited talk delivered at the National Seminar on "Emerging Trends in Virtualization and Cloud Computing" held on February 15, 2011 at MAIT Ghaziabad campus.



- 2 *Exposure Time Calculator for IFOSC and Sky Background Estimation* a seminar delivered on June 14, 2006 at the Indian Institute of Astrophysics, Bangalore (IIA).
- 3 *Optical Observations and Spectropolarimetry at the Vainu Bappu Observatory* A seminar delivered at S. N. Bose Institute for Basic Sciences, Kolkata in March 2004.
- 4 *Knowing Wild 2, the Target of StarDust.* A seminar delivered at National Center for Radio Astronomy (NCRA), Pune; as part of IUCAA-NCRA IDG Meeting, in December 5, 2003
- 5 *An Optical, Dual-Beam, Automated Medium Resolution Spectropolarimeter for the Vainu Bappu Telescope* A seminar delivered at Inter-University Centre for Astronomy and Astrophysics (IUCAA) in June 2002.
- 6 *Spectropolarimetric Instrumentation and Techniques used in Stellar Astronomy and its Implementation in Solar Physics.* A seminar delivered at Udaipur Solar Observatory (USO), Udaipur in June 2002.
- 7 *Cometary Dust.* A seminar delivered at Space Physics Laboratory (SPL), Vikram Sarabhai Space Center (VSSC), Tiruvananthapuram in April 2002.
- 8 Lecture on *Astro-Photography and its techniques* in January 1999. at the YMCA Bangalore. The lecture was attended by Professional Photographers and general public.

### **Details of Various Workshops etc. where I was a Resource Person:**

1. **“Comet Imaging and Science”** and **“Estimation of the Sky Brightness”**. International Workshop on Earth and the Sky, Astrophotography and Image Processing held at Nehru Planetarium, New Delhi from October 3 – 6, 2008.
2. **“Perception of Science Through Observational Astronomy – A Research Outlook”**. Workshop on Research Methodology in Basic Sciences organized by Association of Indian Universities, New Delhi and Assam University, Silchar, from November 13 to 17, 2006.
3. **“How LIGHT Throws Light in Astronomy”** Workshop on Astronomy and Astrophysics organized by the Department of Physics, Assam University, Silchar, held at Assam University, Silchar, India on February 21, 2006.
4. **“Installation of Image Reduction and Analysis Facility (IRAF) software packages and its use”** Workshop on “Development of Astronomy facilities in the Universities and Colleges” held at IUCAA, Pune India from August 29 to August 31, 2005.
5. **“Image Processing and Data Reduction”** in a Workshop on Astronomy with Small Telescope held at IUCAA, Pune India from January 6 to 10, 2003.

### **List of Various Courses Taught :**

- (2001-2002) PG Level “Planetary Science and Cometary Physics” at M. P. Birla Institute of Fundamental Research, Bangalore.
- (2004-2007) Quantum Mechanics I & II as part of M.Sc Physics course at Assam University, Silchar.
- (2004-2007) Astrophysics I & II as part of M.Sc Physics special paper at Assam University, Silchar.
- (2004-2007) Computational Physics and Numerical Methods of M.Sc Physics special paper at Assam University, Silchar.
- (2004-2007) Image Processing for M.Sc Physics, Astrophysics special Paper at Assam University, Silchar.
- (2007) *Physics I Lab* for B.Tech (I-Sem) at IIIT-Allahabad.
- (2007-2011) *Computer Control System* for B.Tech (V-Sem) at IIIT-Allahabad.
- (2007-2010) *Humanoid Robots* for B.Tech (VII-Sem) and M.Tech (III-Sem) at IIIT-Allahabad.
- (2007-2012) *Graphics & Visual Computing* for B.Tech (IV-Sem) IIIT-Allahabad.
- (2007-2009) *Electronics Instrumentation* for B.Tech (IV-Sem) IIIT-Allahabad.
- (2007-2009) *Advance Graphics & Animation* for M.Tech (II-Sem) IIIT-Allahabad.
- (2011-2012) *Artificial Live Simulation* for M.Tech (II-Sem) & Research Scholars at IIIT- Allahabad.
- (2011) *Concepts in Basic Science* for M.Tech (I-Sem) & Research Scholars at IIIT- Allahabad.

### **Academic Honors/Distinctions/Awards Received:**

- Awarded the Best Ph.D. Thesis presentation (2002) at the XXI meeting of the Astronomical Society of India.
- Awarded Best M.Sc. Project of the year in Physics (1992) I.I.T. Kanpur.
- Merit cum Means Scholarship during M.Sc. in Physics at I.I.T. Kanpur.

### **Membership:**

- Visiting Associate of IUCAA since July, 2004.
- Life Member of the Astronomical Society of India (825/L) *since 1996*.
- Alumni of Vatican Observatory Summer Schools (*1997 batch*).
- IEEE Membership Member No: 92245820
- ACM Membership Member No.: 1592177.

### **Any Foreign Visits under Exchange or Any Other Programs:**

- Visited Italy, Rome in June-July 1997 to attend the Sixth Summer School in Observational Astronomy and Astrophysics, held at Castel Gandolfo, Rome, Italy from 8 June to 5 July, 1997. *Visit Sponsored by the Vatican Observatory*
- Visited Italy, Rome in June 1998 to attend the International Symposium on Astrophysics Research And Science Education (June 14-21 1998) at the Vatican Observatory, Castel Gandolfo, Italy. *Visit Sponsored by the Vatican Observatory*

### **Received any National fellowships / Awards/ Recognitions:**

- National Superconductivity Fellowship of DST on a project for assembly of the low temperature cryogenic system for the Mössbauer setup and fabrication of the vacuum system for it, at IIT - Kanpur. [1992-93]
- DST Fellowship for research leading to a Ph.D. at Indian Institute of Astrophysics (IIA), Bangalore. [1993-2001]
- ISRO RESPONSE Post-Doctoral Fellowship for the project “Modeling the Diffuse UV Radiation Field” for the Ultraviolet Imaging Telescope (UVIT) proposed to be launch as part of ASTROSAT, a multi-wavelength astronomy satellite. [2001-02]
- IUCAA Post-Doctoral Fellowship. [2002-04]

### **Science Popularization:**

- 1 Interaction with School Children and Villagers of Gaurisar, near Ratangar, Rajasthan during total Solar Eclipse of October 24, 1995. See Chakraborty *et al.* 1997. *Kodaikanal Obs. Bull.* Vol 13, p-69.
- 2 Interaction with Teams of School Children, College students and Teachers at the Vainu Bappu Observatory (VBO) Kavalur.
- 3 Astro-Photography from VBO. The photographs of Comet C/1996 B2 (Hyakutake) and 1995 O1 (Hale-Bopp) that I have taken, were used by IIA for public outreach, press releases and Cover of the institute Annual Report. My comet photographs have also appeared as front cover of Current Science (see *Current Science* Vol. 70 No.12, p-1047.) and Resonance.
- 4 Lecture on Astro-Photography and its techniques at the YMCA Bangalore. The lecture was attended by Professional Photographers and general public.
- 5 Lecture Demonstration in Hindi and English to two batches of 500 school students at the IUCAA Chandrashekar Auditorium. Topic of the Lecture was “*Our Solar System, a probe for our Origin*”
- 6 Took active part in Science-day activity at IIA and at IUCAA for the year 1994 to 2004.
- 7 Developed large size posters for the Science-day activity at IUCAA for the year 2003 and 2004.
- 8 Organized Science-day talks, Fabrication of Scientific Models and Posters for Science-day activity at Assam University, Silchar for the year 2005.

- 9 Delivered a popular Scientific and historical talk “Indian Science Through C. V. Raman” for the Science-day and Year of Physics celebration at Assam University, Silchar on February 28, 2005.
- 10 Delivered a popular science talk “In Search of the Origin” Organised by Assam University Teachers’ Association at Assam University, Silchar on 2005.
- 11 Delivered a popular science talk “Inquisitive the Universe, in Search for the Truth!” at Cachar Collage, Silchar on November 23, 2005. This popular science talk was organized as part of the Year of Physics celebrated at Cachar College, Silchar.
- 12 Delivered a popular science talk “*The Life Information! — In Search for the Origin*” at IIT, Allahabad on the ocation of National Science Day, February 28, 2008.
- 13 Organized the National Science day in IIT- Allahabad on February 28, 2008 and 2009.
- 14 Active participation in 4 Science Conclave of Nobel Laureates held in December 2008 and 2011 as an LOC member. I was part of the VVIP Nobel Laureate Escort Team and often acted as an intermediate during interactions of the Nobel Laureates with the students.
- 15 For the recent 2011 Science Conclave of Nobel Laureates, I coordinated and arranged for the night-sky viewing through telescopes and demonstration of scientific toys made from simple things.

## **Accomplishments and Technical Expertise:**

### **INSTRUMENTATION:**

#### **Fabrication of a 200 Watts CO<sub>2</sub> Laser [1991-92]. (IIT-Kanpur)**

Fabrication of a 200 Watts CO<sub>2</sub> Laser was a M.Sc. Project at the IIT-Kanpur. The project was to design, fabricate and optimize an axial, slow flow diffusion cooled, 200W CO<sub>2</sub> laser. The laser can lase on at least 400 deferent wavelengths in the 8.7 $\mu$  to 11.8 $\mu$  region. The most dominant transition is however at 10.6 $\mu$ .

The project was completed in 2 semesters (1year) and it was awarded the 1992 best project of the year award in physics.

#### **Assembly of the Low Temperature Cryogenic System for the Mössbauer Setup, and Fabrication of the Vacuum System for it. [1992-93] (IIT-Kanpur)**

The project was done under the National Superconductivity Fellowship of the Department of Science and Technology (DST) at IIT-Kanpur.

#### **Planetary Coronagraph for the Vainu Bappu Observatory (VBO). [1995-96] (IIA-Bangalore)**

A planetary coronagraph was fabricated at IIA for observation of Saturn’s outer rings during its ring plane crossing.

#### **An Automated Medium Resolution Spectropolarimeter for the Vainu Bappu Telescope [1996-99] (IIA-Bangalore)**

This instrument was fabricated as part of my Ph.D. research. It is an optical, dual-beam, automated, medium resolution spectropolarimeter for the cassegrain focus ( $f/13$ ) of the

2.34 m Vainu Bappu Telescope (VBT). The instrument consists of a superachromatic half-wave plate (HWP) of Pancharatnam design and a modified Glan-Taylor polarizing beam splitter (MGTP) as analyzer. The spectropolarimeter is totally automated and controlled from the observational console room at VBT. Now, this instrument forms part of the observational infrastructure at the VBT.

#### **IUCAA 2m Telescope Instrumentation [2002-2004] (IUCAA – Pune)**

Worked on the polarimetric unit and calibration of the IUCAA Faint Object Spectrometer and Camera (IFOSC). Involved in the installation of the IUCAA 2m telescope and development of the procedures for automation of the CCD data calibration. I have also developed an Exposure Time Calculator (ETC) for IFOSC and Background Sky estimator at the IUCAA Telescope site and possible implementation for the HFOSC on the Himalayan Chandra Telescope (HCT) at Hanle, Ladhak.

## **Adaptive Modular Active Leg (AMAL) A Robotic Prosthetic Leg Project of IIIT-Allahabad [2007-2011-] (IIIT – Allahabad)**

AMAL is Robotic Prosthetic Leg with controlled knee joint rigidity. It helps a patient who has lost one of his legs above the knee to walk efficiently and comfortably. The Project is in its advance stage where AMAL-1 is being tested on different patients at ALIMCO Artificial Limb Manufacturing Corporation of India, at Kanpur.

## **Human Gait Oscillation Detector (HGOD) [2007-2012-] (IIIT – Allahabad)**

Development of a bio-informatics diagnostic tool understand and analyze human Gait will provide us an insight on Human bi-pedal locomotion and its stability. A multi-sensor suit, for detection of limb oscillations during a human gait, has been developed. It has been named "HGOD", an acronym of the "Human Gait Oscillation Detector". This suit will be used for creating a database of gait oscillations.

## **Development of High Performance Computing Facility with GP-GPU Programming using NVIDIA CUDA Libraries and OpenCL [2008-2012-] (IIIT – Allahabad)**

Work on development of High Performance Computing (HPC) Facility with GP-GPU Programming using NVIDIA GForce Graphics card using CUDA Libraries were begun at IIIT-Allahabad as a prelude to setting up of an hierarchical HPC facility involving multiple multi-processor CPU with multiple GPU programming for Large Database.

## **IIITA ANT (Autonomous Navigational Test-bed), [2008-2012-] (IIIT – Allahabad)**

Development of a real platform to implement different Artificial Intelligence (AI) and Life Simulation (LS) methods for Navigation and Surveillance purpose using subsumption architecture having different layered modules. These Modules are: 1) Tele-operation, 2)Obstacle avoidance, 3)Lane detection, 4)Localization, 5)Terrain mapping using stereoscopic vision, 6)Tracking Target person, 7) Hand gesture communication, 8) speech Command control. Each module has their own limitations and constraints. It is hoped that on completion, these modules will be implemented on the ANT.

## **COMPUTATION – A Data Analytical Experience:**

- Some of the types of computers that I have used are: Sun Sparc workstations, 4 CPU Sparc SUNW, Ultra-4, 4 CPU Power Challenge 10000 (Silicon Graphics), Indy R5000 (Silicon Graphics), HP-9000 and PCs with different Intel Processors.
- Some of the operating systems that I have used are: Unix, Linux, VMS, MS-Windows and DOS.
- Some of the computer languages and software packages that I have used and are familiar with: C, Fortran, Pascal, IRAF, STSDAS, DAOPHOTE, IDL, Super-Mongo, MatLab, AutoCAD, Xfig, PhotoShop, HTML, PowerPoint, MS-Office and LaTeX.
- Obtained a strong training in data-structure, computation and programming languages at IIT-Kanpur.
- Developed and use of C, Fortran and Pascal Codes, Developed C codes for modeling the diffused UV radiation field for the UVIT-ASTROSAT.
- Developed C codes with graphical web based interfaced cgi script for the Exposure Time Calculator (ETC) for IFOSC on IUCAA Telescope. This code is being modified for the Himalayan Faint Object Spectrometer and Camera (HFOSC) on the Himalayan Chandra Telescope at Hanle, Ladakh.
- I have extensively used IRAF for image processing and CCD photometric data reductions which includes imaging, spectroscopic and spectropolarimetric data reductions.
- Image enhancement techniques were also developed for enhancement of cometary jets.
- Linking IRAF and Super-Mongo routines to Fortran code.
- Development of Spectropolarimetric Reduction Software (SPRS). *SPRS is totally compatible with IRAF and can be run as an IRAF task.*
- Development and use of Fortran and C Codes.
- Development of cgi scripts for a web based interacting interface for the Exposure Time Calculator.
- Developing C Codes for modeling the diffused UV radiation field.
- Learning to parallelize codes using Message-Passing Interface (MPI).

## **Organizational Skills:**

- Convener for the Technical Support and Event Management for the International Conference on Current Trends in Algal Bioresource Utilization held from December 4 to 6, 2006, at Assam University, Silchar -788 011, Assam India.

- Organizing a One-Day Workshop in Astronomy and Astrophysics with IUCAA Faculties on February 21, 2006, at Assam University, Silchar, India.
- Coordinated and anchored a panel discussion on Astronomy and Astrophysics for the Doordarshan Silchar on February 20, 2006.
- Coordinated deferent observational programs from VBO for IIA from 1994 to 2001.
- Helped Organize the first one-day workshop on TAUX held at IIA in 2003.
- Organize Science-Day function at IIA, IUCAA, Assam University and at IIT-Allahabad.
- Part of the Organizing committee of Science Conclaves other conferences held at IIT-Allahabad.
- Been part of few committees at IIT-Allahabad.
- WARDEN of Boys Hostel -2 at IIT-Allahabad.
- Instrumental in MOU with **University of Lincoln, U. K.** and **IIT-Allahabad.**
- Assisted Prof. G. C. Nandi organized a DST PAC Meeting of eminent scientists at IIT-Allahabad.

## **OBSERVATIONS / EXPERIMENTS:**

For most of my astronomical observations, I have personally used the telescopes at the Vainu Bappu Observatory (VBO), Kavalur India, which is operated by the Indian Institute of Astrophysics (IIA). The Telescopes that I have used are:

The 2 m IUCAA Telescope at  $f/10$  cassegrain focus.

The 2 m Himalayan Chandra Telescope at  $f/9$  cassegrain focus.

The 2.34 m Vainu Bappu Telescope at  $f/3.24$  prime focus and at  $f/13$  cassegrain focus.

The 1.02 m Carl Zeiss reflector at  $f/13$  cassegrain focus.

The 75 cm reflector at  $f/13$  cassegrain focus.

I have performed imaging, medium resolution spectroscopy and spectropolarimetry using these telescopes and I have extensively used Liquid  $N_2$  cooled CCD cameras as detectors. The major activities in observations that I have been part of are:

- a. Co-investigator in the observation of Comet Shoemaker-Levy 9 and its crash on Jupiter as observed from the Vainu Bappu Observatory, I.I.A. (R. Cowsik, 1994, *Comet Shoemaker-Levy 9 collision with Jupiter. Pre-and post-crash observations by IIA, Current Science* Vol. 67 No.6 p-424)
- b. Coronagraphic observation of Saturn's outer ring during its ring-plane crossing.
- c. Observation of Comet C/1996 B2 (Hyakutake). Coordinated the observations from VBO. (R. Vasundhara, 1996, *Comet Hyakutake, Current Science* Vol. 70 No.12, p-1047.)
- d. Observation of Comet 1995 O1 (Hale-Bopp) from 1995 to 1998.
- e. Continued Observation of various Comets from 1998 to 2006.
- f. Observations of Jupiter and Jovian Satellites.
- g. Observation of Minor Planets.

## **16. Proficiency in Languages:**

Well versed in English.

Well versed in French (Though a little out of touch).

Amongst the Indian Languages, I am quite well versed in Bengali, Hindi and Sanskrit. can follow and speak a little of Gujarati, Oriya, Tamil and Kanada.

## **17. Hobbies:**

Teaching, Building Instruments, Understanding Intelligence, Science popularization, Astro-Photography, Photography and Painting.

**Dr. Pavan Chakraborty**