ANNEXURE 1

School of Mathematics Sciences —A Profile as in March 2010

Contents

1. Introduction

Swami Vivekananda envisioned a University at Belur Math, West Bengal, the headquarters of the Ramakrishna Mission. In his conversation with Jamshedji Tata, it was indicated that the spirit of austerity, service and renunciation, traditionally associated with monasticism could be united with the quest for Truth and Universality that Science embodies. An inevitable fruit of such a synthesis would be a vigorous pursuit of science as an aspect of Karma Yoga. Truth would be sought by research and the knowledge obtained disseminated through teaching, making knowledge universally available. The VivekanandaSchool of Mathematical Sciences at the fledgling Ramakrishna Mission Vivekananda University, headquartered at Belur, has been set up keeping these twin ideals in mind.

We shall first indicate that at the National level, a realization of these objectives would fulfill a deeply felt National need.

1.1. **Science Education: A synthesis of two paradigms.** Science is guided by two basic principles:

- Inquiry into objective Truth: Science, at its best, is an inquiry into the nature of reality.
- Democratic Spirit: Scientific knowledge, and the benefits accruing from the above inquiry, are not reserved for any individual or group of individuals. They are, at least in principle if not in practice, meant for all.

While all research institutions clearly subscribe to the first principle, viz. Inquiry into Truth, the second principle, viz. Service, did, for a while, become an issue of secondary importance. On the other hand, teaching institutions, while focusing on dissemination of knowledge, often face impediments in actively creating new

knowledge, i.e. conducting active research. The resulting dichotomy into research and teaching institutions has become an unfortunate feature of higher education in post-independence India. As a result students in teaching institutions do not, by and large, get the benefit of learning from active researchers, and research institutions suffer from the lack of qualified students. Much talent seems to go waste.

The School of Mathematical Sciences aims at becoming one of the Indian institutions that bridge this gap, so that its faculty members will at the same time conduct research and train and orient students towards higher scientific activity. The research conducted will have 'Inquiry into Truth' as its guiding principle, while teaching, or dissemination of knowledge will be taken as a form of service by which the knowledge gained through research is made available to all. This is to ensure two things:

1) Undergraduate students get exposed to research from the beginning of their career. Teachers often serve as role models for students. A motivated researcher-cum-teacher can serve this purpose best.

2) Research institutions need students who are motivated and aware of current research. There is a severe lack of such students in the fundamental sciences today in India. A programme that fills this gap will thus be fulfilling a national need in developing technically qualified scientific manpower.

We thus hope to address, in some measure, the following issues, that Indian science is facing at present:

(1) A lack of a scientific middle class. What this means is that certain individuals through self-effort, do attain to a certain excellence. However, they form a very small minority. The science education in its higher reaches is plagued by the lack of a system to bring larger numbers of students up to par with centres of excellence abroad. Thus, while India does have a potential for excellence in terms of bright youngsters, this does not translate into a manifestation of excellence due to lack of institutions that can tap this talent and bring it to fruition.

(2) Quality of research, still remains below par, compared to developed countries. Quality is to be evaluated roughly in terms of peer review, publications in reputed journals and citations. This, again, is not due to lack of talent. Indian researchers abroad seem to be doing rather well. However, the research atmosphere within the country, still needs to develop and meet international standards.

The National Government has already taken note of these problems and the setting up of Indian Institutes of Science Education and Research (IISER's) and National Institutes of Science Education and Research (NISER's), as well as the present national emphasis on Education in general and Higher Education in particular indicate the commitment of the Government to the cause. Further, several excellent research institutions across the country – the Tata Institute of Fundamental Research, the Institute of Mathematical Sciences, the Harish chandra Research Institute, the Chennai Mathematical Institute, the Indian Institute of Science foremost amongst them – have pledged their troth to teaching as a component of their activities.

In the following we shall indicate the first steps that we have taken over the last couple of years to address the above crisis and fulfill a National Need.

We shall also indicate our plans for the future in terms of faculty we hope to recruit, in case funds are forthcoming.

2. Faculty

In the fundamental sciences we have been able to start building a school that we hope shall meet International Standards once it starts functioning at full strength. We indicate below that the **quality**, though not the quantity of faculty below meets such standards. Towards this we present in summary, the Academic Credentials of our faculty.

2.1. Mathematics.

(I) KINGSHOOK BISWAS

PhD Mathematics. UCLA and Universite Paris XIII : mention tres honorable. (2005) Thesis title : On the geometry of hedgehogs and log-Riemann surfaces.

Papers (in approximately reverse chronological order)

(1) Quasiconformal Deformations of Nonlinearizable germs, preprint 2010, arxiv:1001.0290.

(2) Simultaneous Linearization of Germs of Commuting Holomorphic Diffeomorphisms , preprint 2009, arxiv:0911.2766.

(3) Flows, Fixed Points and Rigidity for Kleinian Groups , arXiv:0903.2419 preprint

(4) Pattern Rigidity in Hyperbolic Spaces: Duality and PD Subgroups (with Mahan Mj), submitted.

(5) Maximal Abelian Torsion Subgroups of Diff(C,0) Preprint, 2008.

(6) Complete Conjugacy Invariants of Nonlinearizable Holomorphic Dynamics , DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS. 2010

(7) Log-Riemann Surfaces (with Ricardo Perez-Marco). Preprint, 2006.

(8) Hedgehogs of Hausdorff Dimension One, Journal of Ergodic Theory and Dynamical Systems Volume 28, Issue 06, December 2008, pp 1713-1727

(9) Smooth Combs Inside Hedgehogs, DISCRETE AND CONTINUOUS DYNAMICAL SYSTEMS. Volume 12, Number 5, May 2005, pg 853-880

Conference Talks:

June 2008. SMCG Conference, NEHU Shillong. Dynamics of Hedgehogs

January 2007. Scuola Normale Superiore Pisa, Conference : Local Holomorphic Dynamics. On hedgehogs and dynamics of nonlinearizable holomorphic dieomorphisms.

Seminar Talks:

November 2006. Universite dAvignon, Geometry and Dynamics seminar. On dynamics near Cremer points : introduction to hedgehogs. February 2006. Stony Brook University, Dynamical Systems seminar.

On dynamics of holomorphic dieo- morphisms near xed points: nonlinearizable dynamics and hedgehogs.

September 2005. Stony Brook University, Dynamical Systems seminar. On log-Riemann surfaces and extending classical Dedekind-Weber theory to certain transcendental curves.

November 2003. Universite Paul Sabatier Toulouse III, Complex Analysis seminar. On the construction of dynamics via tube-log Riemann surfaces, after Perez-Marco.

October 2002. University of California Los Angeles, Analysis Seminar. On Yoccozs proof of Siegels Theorem and the optimality of the Brjuno condition for linearization near irrationally indierent xed points.

Distinctions

June 2001. Horn-Moez Price for Excellence in First-Year Graduate Studies. Department of Mathematics, University of California, Los Angeles.

June 2004. University of California, Los Angeles Dissertation Year Fellowship.

(II) MAHAN MJ (formerly, Mahan Mitra)
PhD, University of California, Berkeley (1997)

Papers (in approximately reverse chronological order)

(1) Appendix to Ending Laminations and Cannon-Thurston Maps, with Shubhabrata Das, preprint 2010, arXiv:1002.2090

(2) Cannon-Thurston Maps for Kleinian Groups, preprint 2010, arxiv:1002.0996

(3) A Combination Theorem for Metric Bundles, preprint (with Pranab Sardar)

(4) Pattern Rigidity and the Hilbert-Smith Conjecture, arXiv:0906.4243, submitted

(5) Splittings and C-Complexes (with Peter Scott and G. A. Swarup), Algebraic and Geometric Topology 9

(2009) 1971-1986
(6) Universal Cannon-Thurston Maps and Curve Complexes, (with Chris Leininger and Saul Schleimer), arXiv:0808.3521, submitted
(7) Relative Hyperbolicity, Trees of Spaces and Cannon-Thurston Maps, (with Abhijit Pal), arXiv:0708.3578, accepted for publication in Geometriae Dedicata
(8) Mapping Class Groups and Interpolating Complexes: Rank, J. Ramanujan Math. Soc. 24, No.4 (2009) 341357
(9) Relative Rigidity, Quasiconvexity and C-Complexes, Algebraic and Geometric Topology vol. 8 (2008) 1691-1716
(10) A Combination Theorem for Strong Relative Hyperbolicity, (with Lawrence Reeves), Geometry and Topology 12 (2008) 1777-1798
(11) Ending Laminations and Cannon-Thurston Maps, submitted to Geometric and Functional Analysis
(12) Cannon-Thurston Maps for Surface Groups, submitted
(13) Cannon-Thurston Maps for Surface Groups I: Amalgamation Geometry and Split Geometry, submitted
(14) Cannon-Thurston Maps, i-bounded Geometry and a theorem of McMullen, preprint
(15) Cannon-Thurston Maps for Pared Manifolds of Bounded Geometry, Geometry and Topology 13 (2009) 189-245
(16) Cannon-Thurston Maps and Bounded Geometry, Teichmuller Theory and Moduli Problems No. 10, 2009, pp. 489511, Proceedings of Workshop on Teichmuller Theory at HRI, Allahabad, published by Ramanujan Mathematical Society
(17) Height in splittings of hyperbolic groups Proc. Indian Acad. Sci. (Math. Sci.), Vol. 114, No. 1, February 2004, pp. 39-54
(18) Thurston boundary of Teichmuller spaces and the commensurability modular group (with I. Biswas and S. Nag) Conformal Geometry and Dynamics 3, 1999, pp. 50-66
(19) On a Theorem of Scott and Swarup Proc. AMS v. 127 no. 6, 1999, pp. 1625-1631
(20) Coarse extrinsic geometry: a survey Geometry And Topology Monographs 1 (1998), The Epstein Birthday Schrift, pp. 341- 364, also available at "http://www.maths.warwick.ac.uk/gt/GTMon1/paper17.abs.html"
(21) Cannon-Thurston Maps for Trees of Hyperbolic Metric Spaces, Jour. Diff. Geom.48, 1998, pp. 135-164
(22) Ending Laminations for Hyperbolic Group Extensions GAFA vol.7 No. 2, 1997, pp. 379-402
(23) Cannon-ThurstonMaps for Hyperbolic Group Extensions, Topology 37, 1998, pp. 527-538
(24) Maps on Boundaries of Hyperbolic Metric Spaces, PhD thesis, U.C. Berkeley, 1997
(25) Widths of Subgroups (with R. Gitik, E. Rips and M. Sageev), Transactions AMS, Jan. 1997, pp. 321-329

Talks

2010

Invited speaker at Autrans, France conference "Around the Cannon Conjecture"

Invited speaker at ICM satellite conference on Geometric Topology and Riemannian Geometry to be held from 12-16 August, 2010 at IISc Bangalore.

Invited speaker at ICM satellite conference on Geometry, Topology and Dynamics of Character Varieties to be held from 10-14 August at Singapore, 2010.

2009

Invited speaker at symposium (to be) held at Homi Bhabha Centre for Science Education (TIFR) in honour of Ramanujan's birth anniversary, 21-22 December 2009.

Colloquium speaker at ISI Kolkata, 9th September 2009

Talk at University of Lille, France, in Topology seminar, June 2009

Talk at Universite Paul Sabatier, France, Toulouse in Topology seminar, June 2009

Visited Universite Paris Sud XI, France from 1-30 June 2009 under a joint Indo-French collaborative research programme ARCUS. Talk on Pattern Rigidity at Universite Paris Sud XI, France

Visited University of Warwick, UK from 1-28 May 2009 for research collaboration with Profs. Caroline Series and Saul Schleimer. A research paper 'On continuous motions of limit sets' is almost complete. 3 talks on Cannon-Thurston Maps to specialists, one in Low-dimensional topology summer event, one in Topology seminar at University of Warwick

2008

Keynote speaker at conference on Foliations, held at ISI Kolkata, November 2008

Organizer and resource person at conference on Surface Mapping Class Groups, held at NEHU Shillong, June 2008. Series of 5 talks on Kleinian groups

Invited speaker at Ramanujan Mathematical Society conference, IIT Kanpur, May 2008

2007

Unity of Mathematics lectures at IIT Kanpur, December 2007 Conference talk on Teichmuller Theory and Kleinian Groups at MSRI Berkeley (special semester on Teichmuller Theory and Kleinian Groups), November 2007

Invited talk at Topology seminar, University of Chicago, October 2007

Invited talk at Topology seminar course (taught by Ian Agol), U.C. Berkeley, October 2007

Three talks at MSRI Berkeley, on Local Connectivity of Limit Sets, October 2007

2006

Talk on Local Connectivity of Limit Sets, Tata Institute of Fundamental Research, December 2006

Talk on Cannon-Thurston Maps for i-bounded Geometry, conference on Geometrical Methods in Topology, Indian Institute of Science, Bangalore, June 2006

Five talks on 3 manifold Topology, conference on Geometrical Methods in Topology, Indian Institute of Science, Bangalore, June 2006

Cannon-Thurston Maps, conference on Teichmuller Theory, Harish- Chandra Research Institute, Allahabad, January 2006

2005 and earlier

Hyperbolic Geometry, ATM School, ISI Kolkata, November 2005

Geometrization, ISI Kolkata, May 2005

Local Connectivity of Limit Sets, University of Calcutta, 2005

Cannon-Thurston Maps, ISI Kolkata, 2005

Hyperbolic Groups, IMSc, Chennai, 1998

Continuous boundary extensions, Epstein Birthday Fest,Warwick, May 1997

Continuous boundary extensions, Caltech, March 1997

Cannon-Thurston maps for bounded geometry Kleinian groups, Kleinian groups and Conformal Dynamics Seminar, U.C. Berkeley, Spring, 1996

Ending Laminations for Hyperbolic Group Extensions, Geometric Group Theory Seminar, U.C. Berkeley, Spring, 1996

Maps between boundaries of Hyperbolic groups, Topology Seminar, U.C. Berkeley, Fall 1995

Group Invariant Peano Curves, Hyperbolic Geometry and Conformal Dynamics Seminar, U.C. Berkeley, Spring, 1995

The k-plane property for surfaces in Negatively Curved 3 manifolds, Geometric Group Theory Seminar,

U.C. Berkeley, Fall, 1994

Distinctions

IFCAPR (CEFIPRA) joint Indo-French project on Analytical and Geometric Aspects of Kleinian Groups, 2010-2013, by Mahan Mj and Kingshook Biswas, in collaboration with Jean-Pierre Otal and Cyril Lecuire of Universite Paul Sabatier, Toulouse III, France. Proposal accepted. DST Research Project on Geometry and Dynamics 2009-12– Mahan Mj and Kingshook Biswas

UGC Major Research Project on Local Connectivity of Limit Sets 2007- 2010

Alfred P. Sloan Doctoral Dissertation Fellowship 1996-1997

U.C. Berkeley Fellowship 1995

Earl C. Anthony Fellowship, U.C. Berkeley 1992-1993

(III) IND**RANATH SENGUPTA**

PhD, Indian Institute of Science, Bangalore (2001)

Papers (in approximately reverse chronological order)

(1) (With Philippe Gimenez and Hema Srinivasan) The Graded Betti Numbers for Certain Binomial Ideals, preprint 2010.

(2) (With Philippe Gimenez and Hema Srinivasan) Minimal free resolution for certain affine monomial curves, preprint 2010(submitted).

(3) (With DebasishMukhopadhyay) On The Smoothness of Blowups for Certain Monomial Curves, preprint 2010(submitted).

(4) (With Debasish Mukhopadhyay) The Rees Algebra for Certain Monomial Curves, preprint 2010(submitted).

(5) (With D. Dey, P. R. Mishra) GB-hash : Hash Functions Using Gr¨obner Basis, preprint, 2010.

(6) (With D. Dey, P. R. Mishra) HF-hash : Hash Functions Using Restricted HFE Challenge-1, preprint 2008(submitted).

(7) Prime Numbers , Mathematics Newsletter, Ramanujan Mathematical Society, 15(3), pp. 62 - 67 (December 2005).

(8) A Grobner Basis for Certain Affine Monomial Curves, Communications in Algebra, 31(3), 1113 - 1129 (2003), DOI : 10.1081/AGB - 120017757.

(9) A Minimal Free Resolution for Certain Affine Monomial Curves in A4, Communications in Algebra, 31(6), pp. 2791 - 2809 (2003), DOI : 10.1081/AGB - 120021893.

(10) (With A. K. Maloo) Criterion for Complete Intersection of certain Monomial Curves, Advances in Algebra and Geometry, University of Hyderabad Conference 2001, Edited by C. Musili, pp.179 - 184, Hindustan Book Agency, 2003.

(11) (With D.P. Patil) Minimal set of generators for the derivation module of certain monomial curves, Communications in Algebra, 27(11), pp. 5619 - 5631 (1999).

Fellowships Awarded:

(i) BOYSCAST Fellowship 2002-2003, for post-doctoral research in Mathematical Sciences, sponsored by Department of Science and Technology, Government of India.

(ii) CSIR Fellowship for Doctoral Research in Mathematics, sponsored by CSIR, Government of India.

Selected Talks:

(1) Symmetric Polynomials and Hilbert's 14th Problem: An Introduction, An Introductory lecture delivered in the UGC Seminar, RKM Vidyamandira, Belur, February 2010.

(2) Syzygies and Betti numbers of certain monomial curves, Seminar, Univ. Valladolid, Spain, December 2009.
(3) Blowup Algebras and Francia's Conjecture for Certain Monomial Curves, Seminar, Univ. Valladolid, Spain, October 2009.
(4) The Fundamental Theorem of Algebra, An Introductory lecture delivered to higher secondary students at JBNSTS, August 2009.
(5) Blowups for Certain Curves, HRI Internation Conference in Mathematics, Harish Chandra Reseach Institute, Allahabad, March 2009.
(6) On Betti Numbers of Certain Affine Monomial Curves at the Tenth Meeting on Computer Algebra and Applications EACA 2006 (Satellite Conference of ICM 2006), Universidad de Sevilla, Spain, September 7 - 9, 2006.
(7) On Affine Monomial Curves: An Overview at the Department of Algebra, Geometry and Topol- ogy, University of Valladolid, Spain, September, 2006.
(8) On Betti Numbers of Certain Algebraic Curves at the National Conference on Mathematical Analysis and Applications, Department of Mathematics, Jadavpur University, Kolkata, March 1-2, 2005.
(9) On Francias Conjecture at the Department of Mathematics, University of Utah, USA, February 2004.
(10) On Monomial Curves at the Department of Mathematics, University of Utah, USA, August 2003.
(11) On Prime Numbers in the UGC-sponsored Refresher Course for College and University Teachers on Recent Advances in Algebra, Analysis and Geometry, at the Department of Mathematics, Jadavpur University, July 15 - August 03, 2002.
(12) On Jacobian Problem at the Department of Mathematics, Indian Institute of Science, Banga- lore, August 2000.
(13) On Minimal set of generators for the derivation module of certain monomial curves in the 14th Annual Conference of Ramanujan Mathematical Society, at the Department of Mathematics, Indian Institute of Science, Bangalore, June 7 - 9, 1999.

School/Conference/Visits

(1) Visited Universidad de Valladolid, Spain during September - December 2009 for two months.
(2) Visited Radboud Univeristy, Nijmegen, Netherlands for a conference in Automorphisms of Affine Spaces during July 2009.
(3) Visited Harish Chandra Research Institute for HRI International Conference in Mathematics during March 2009.
(4) Visited Department of Mathematics, University of Missouri- Columbia, USA during the Fall Semester of 2007 as a Visiting Professor.
(5) Attended the International School and Workshop on Polynomial Automorphisms and Related Top- ics (an ICTP activity) at the Institute of Mathematics, Hanoi, Vietnam, October 9 - 20, 2006.
(6) Attended ICM 2006 in Madrid, Spain, August 22 - 30, 2006 with NBHM grant.
(7) Visited Department of Algebra, Geometry and Topology, University of Valladolid, Spain, August 31 - September 6, 2006 for collaborative research with Professor Philippe Gimenez.
(8) Visited Department of Mathematics, University of Utah, Salt Lake City, USA for post-doctoral research in Mathematics with BOYSCAST Fellowship, August 2003 - February 2004.
(9) Attended theWorkshop on Computational Algebraic Geometry, held at Harish Chandra Research Institute, Allahabad, January 6 - 11, 2003.
(10) Attended the International Conference on Algebra and Geometry, held at the Department of Mathematics and Statistics, University of Hyderabad, December 7 - 12, 2001.
(11) Attended the Summer School on Algebraic Geometry, held at International Centre for Theoretical Physics, Trieste, Italy, July 1999.

(12) Visited Department ofMathematics, Ruhr-Universit¨at Bochum, Germany, August - September, 1999.
(13) Visited Department of Mathematics, Indian Institute of Technology, Kanpur, December 1998 for collaborative research with Professor Alok Kumar Maloo.

(IV) ASHOKE ROY
Visiting Professor
PhD, Massachusetts Institute of Technology, (1967)

Recent Papers (written while at RKMVU)
(1) Densely ball remotal subspaces of C(K), (with Pradipta Bandyopadhyay) and Tanmoy Paul, to appear in Indagationes Math.
(2) Ball remotality of M-ideals in some function spaces and function algebras , (with Pradipta Bandyopadhyay) and Tanmoy Paul, Positivity, August 2009 DOI 10.1007/s11117-009-0030-7

(V) SUKUMAR DAS ADHIKARI
Adjunct Faculty Permanent Faculty at HRI Allahabad
Homepage: http://www.hri.res.in/ adhikari/

(VI) PhD Students

i. Pranab Sardar
ii. Shubhabrata Das
iii. Sabyasachi Mukherjee
iv. Tathagata Banerjee
v. Joydip Saha

2.2. Physics.

(I) ABHIJIT BANDYOPADH**YAY**
PhD, Saha Institute of Nuclear Physics, Kolkata (2005)

Papers (in approximately reverse chronological order)
(1) "Constraining Scalar Singlet DarkMatter with CDMS, XENON and DAMA and Prediction for Direct Detection Rates" - A. Bandyopadhyay, S. Chakraborty, A. Ghosal and D. Majumdar arXiv:1003.0809 [hep-ph](2010) (submitted)
(2) "Interpreting the bounds on Dark Matter induced muons at Super-Kamiokande in the light of CDMS data" - A. Bandyopadhyay, S. Chakraborty and D. Majumdar arXiv:1002.0753 [hep-ph](2010)(submitted)
(3) "Neutrino Oscillation Parameters After High Statistics Kam- LAND Results" -A. Bandyopadhyay, S. Choubey, S. Goswami, S. T. Petcov and D. P. Roy arXiv:0804.4857 [hep-ph](2008)
(4) "The (3+2) Neutrino Mass Spectrum and Double Chooz" - A. Bandyopadhyay and S. Choubey arXiv:0707.2481 [hep-ph](2007) VIVEKANANDA SCHOOL OF MATHEMATICAL SCIENCES: PROFILE 13
(5) "Constraints on flavor-dependent long range forces from solar neutrinos and KamLAND" - A. Bandyopadhyay, A. Dighe and A. S. Joshipura Phys. Rev. D 75, 093005 (2007) [arXiv:hep-ph/0610263]
(6) "Solar Model Parameters and Direct Measurements of Solar Neutrino Fluxes" - A. Bandyopadhyay, S. Choubey, S. Goswami and S. T. Petcov Phys. Rev. D 75, 093007 (2007) [arXiv:hep-ph/0608323]
(7) "High precision measurements of Theta(solar) in solar and reactor neutrino experiments" - A. Bandyopadhyay, S. Choubey, S. Goswami and S. T. Petcov Phys. Rev. D 72, 033013 (2005) [arXiv:hep-ph/0410283]

(8) "Update of the solar neutrino oscillation analysis with the 766- Ty KamLAND spectrum" - A. Bandyopadhyay, S. Choubey, S. Goswami, S. T. Petcov and D. P. Roy Phys. Lett. B 608, 115 (2005) [arXiv:hep-ph/0406328]
(9) "Prospects of probing _13 and neutrino mass hierarchy by supernova neutrinos in KamLAND" - A. Bandyopadhyay, S. Choubey, S. Goswami and K. Kar arXiv:hep-ph/0312315 (2003)
(10) "On the measurement of solar neutrino oscillation parameters with KamLAND" - A. Bandyopadhyay, S. Choubey, S. Goswami and S. T. Petcov Phys. Lett. B 581, 62 (2004) [arXiv:hep-ph/0309236]
(11) "Constraints on neutrino oscillation parameters from the SNO salt phase data" - A. Bandyopadhyay, S. Choubey, S. Goswami, S. T. Petcov and D. P. Roy Phys. Lett. B 583, 134 (2004) [arXiv:hep-ph/0309174]
(12) "Exploring the sensitivity of current and future experiments to Theta(odot)" - A. Bandyopadhyay, S. Choubey and S. Goswami Phys. Rev. D 67, 113011 (2003) [arXiv:hep-ph/0302243]
(13) "The solar neutrino problem after the first results from Kam- LAND" - A. Bandyopadhyay, S. Choubey, R. Gandhi, S. Goswami and D. P. Roy Phys. Lett. B 559, 121 (2003) [arXiv:hep-ph/0212146]
(14) "Testing the solar LMA region with KamLAND data. ((A))" - A. Bandyopadhyay, S. Choubey, R. Gandhi, S. Goswami and D. P. Roy J. Phys. G 29, 2465 (2003) [arXiv:hep-ph/0211266]
(15) "Implications of the first neutral current data from SNO for solar neutrino oscillation" - A. Bandyopadhyay, S. Choubey, Goswami and D. P. Roy Phys. Lett. B 540, 14 (2002) [arXiv:hep-ph/0204286]
(16) "Neutrino decay confronts the SNO data" - A. Bandyopadhyay, S. Choubey and S. Goswami Phys. Lett. B 555, 33 (2003) [arXiv:hep-ph/0204173]
(17) "What can the SNO neutral current rate teach us about the solar neutrino anomaly" A. Bandyopadhyay, S. Choubey, S. Goswami and D. P. Roy Mod. Phys. Lett. A 17, 1455 (2002) [arXiv:hep-ph/0203169]
(18) "Three generation neutrino oscillation parameters after SNO" - A. Bandyopadhyay, S. Choubey, S. Goswami and K. Kar Phys. Rev. D 65, 073031 (2002) [arXiv:hep-ph/0110307]
(19) "Impact of the first SNO results on neutrino mass and mixing" - A. Bandyopadhyay, S. Choubey, S. Goswami and K. Kar Phys. Lett. B 519, 83 (2001) [arXiv:hep-ph/0106264]
(20) "MSW mediated neutrino decay and the solar neutrino problem" - A. Bandyopadhyay, S. Choubey and S. Goswami Phys. Rev. D 63, 113019 (2001) [arXiv:hep-ph/0101273]

Schools / Conferences / Workshops/ Visits:

(1) Workshop on Neutrino Physics, Saha Institute of Nuclear Physics, Kolkata, India, August, 2000.
(2) XVI SERC School on Theoretical High Energy Physics, Harishchandra Research Institute, Allahabad, India, February 25 - March 16, 2001.
(3) DAE-BRNS Symposium on Nuclear Physics, Saha Institute of Nuclear Physics, Kolkata, India, December 2001.
(4) Workshop on High Energy Physics, Harishchandra Research Institute, Allahabad, India, January 4 - January 15, 2002
(5) Visit at Physics Department, Harishchandra Research Institute, Allahabad, India, during July, 2002.
(6) School on Neutrino Physics and Astrophysics, Abdus Salam ICTP, Trieste, Italy, September 23 - October 4, 2002
(7) Visit at the Department of High Energy Physics, Abdus Salam ICTP, Trieste, Italy,during 5th September - 22nd November, 2002.
(8) Visit at Physics Department, Harishchandra Research Institute, Allahabad,India, during Nov-Dec,2003.
(9) Workshop on High Energy Physics, Indian Institute of Technology, Bombay, Mumbai, India, January 5 - January 16, 2004
(10) International conference on perspectives in particle physics, gravity and cosmology, Physical Research Laboratory, Ahmedabad, India, March 30 - April 3, 2004
(11) Visit at Theory Division, Tata Institute of Fundamental Research, Mumbai, India, July, 2004.
(12) XVI DAE-BRNS High Energy Symposium, Saha Institute of Nuclear Physics, Kolkata, India, Nov 29- Dec

3, 2004
(13) Visit at Theory Division, Physical Research Laboratory, Ahmedabad, India, July 11 - July 22, 2005
(14) Physics with atmospheric neutrinos and neutrinos from muon storage rings, Indian Institute of Technology, Bombay, Mumbai, India, August 1 - August 2, 2005
(15) Visit at Theory Division, Saha Institute of Nuclear Physics, Kolkata, India, Sept 26 - Sept 30, 2005
(16) IXWorkshop on High Energy Physics Phenomenology, Institute of Physics, Bhubaneswar, India,January 3 - January 14, 2006
(17) INO training school (Phase II), Variable Energy Cyclotron Centre, Kolkata, India, May 1 - May 13, 2006
(18) Workshop on LHC physics, Tata Institute of Fundamental Research, Mumbai, India, September 4 -September 8, 2006
(19) 21st International Workshop on Weak Interactions and Neutrinos, Saha Institute of Nuclear Physics, Kolkata, India, January 15 - January 20, 2007
(20) Joint Indo-German School andWorkshop - Neutrinos in Physics, Astrophysics and Cosmology, Tata Institute of Fundamental Research, Mumbai, India, February 12 - February 23, 2007.
(21) X Workshop on High Energy Physics Phenomenology, Institute of Mathematical Science, Chennai, India, January 2 - January 11, 2008.
(22) Workshop on 'Neutrinos and Beams' organized by Saha Institute of Nuclear Physics, at Darjeeling, India, 6-9 May, 2008.
(23) International workshop on neutrinos: Nu HoRIzons, at Harishchandra Research Institute, 13-15 February, 2008
(24) XIWorkshop on High Energy Physics Phenomenology, Physical Research Laboratory, January 2-13, 2010

Selected Talks/Seminars

(1) Solar neutrino problem and potentials of the KamLAND Experiment. Talk at High Energy Physics Department, Abdus Salam ICTP, Trieste, Italy, November 2002.
(2) Neutrinos from Japanese reactors and their impact on neutrino oscillations. Talk at Theory Group, Saha Institute of Nuclear Physics, Kolkata, India, September 2003.
(3) Bound on the oscillation parameters from reactor neutrinos. Talk at Physics Department, Harishchandra Research Institute, Allahabad, India, December 2003.
(4) Probing _13 and neutrino mass hierarchy by supernova neutrinos in KamLAND. Talk at Physics Department, Physical Research Laboratory, Ahmedabad, India, April 2004.
(5) Global Analysis of Neutrino Oscillation Talk at Theory Division, Tata Institute of Fundamental Research, Mumbai, India, July 2004.
(6) The Absolute Neutrino Mass Scale, Majorana Neutrinos, CP Violation Phases and the Neutrino less Double Beta Decay Talk at Theory division, Tata Institute of Fundamental Research, Mumbai, India, June 2005.
(7) Current limits on Neutrino Masses and Mixings Talk in the conference Physics with Atmospheric Neutrinos and Neutrinos from muon Storage Rings at Indian Institute of Technology, Bombay, Mumbai, India, August 1, 2005.
(8) Determination of the parameters of solar model using measurements of solar neutrino fluxes Collo- quium at Tata Institute of Fundamental Research, Mumbai, India, April 2006
(9) Measurements of solar neutrino fluxes and solar model parameters Talk in the 21st International Workshop on Weak Interactions and Neutrinos at Saha Institute of Nuclear Physics, Kolkata, India, January 2007.
(10) Direct measurement of solar neutrino fluxes and determination of solar model parameters. Talk in the Joint Indo-German School and Workshop - Neutrinos in Physics, Astrophysics and Cosmology at Tata Institute of Fundamental Research, Mumbai, India, February 2007.

(II) PRASANTA KUMAR MUKHERJEE
Visiting Professor PhD, Saha Institute of Nuclear Physics, Kolkata (1972)

Recent Papers (written while at RKMVU)
(1) Doubly excited 1Se resonance states of two electron atoms, Jayanta K. Saha, S. Bhattacharyya, T. K. Mukherjee and P. K. Mukherjee (Submitted to International Journal of Quantum Chmistry, Special Issue, 2010)
(2) 1,3Do and 1,3Pe states of two electron atoms under Debye plasma, Jayanta K. Saha, S. Bhattacharyya, T. K. Mukherjee and P. K. Mukherjee (In press), Jornal of Quantitative Spectroscopy and Radiative Transfer, 2010.
(3) Spectroscopy of Atoms in Liquid Helium Environment: A Theoretical Perspective - Prasanta K. Mukherjee , Kaline Coutinho, Sylvio Canuto, Burkhard Fricke P. Piecuch et al. (eds.), Advances in the Theory of Atomic and Molecular Systems, Progress in Theoretical Chemistry and Physics 20, DOI 10.1007/978-90- 481-2985-0 29 C Springer Science+Business Media B.V. 2009
(4) Spectra of helium like carbon, aluminium and argon under strongly coupled plasma, A. N. Sil, J. Anton, S. Fritzsche, P. K. Mukherjee and Burkhard Fricke, Eur. Phys. J., D 55, 645 , 2009.
(5) 2pnp (1,3Pe) state of neutral Helium and Li+ ion under Debye plasma : J. K. Saha, S. Bhatacharyya, T. K. Mukherjee and P. K. Mukherjee , J. Phys. B. : At. Mol. Opt. Phys., 42, 245701, 2009.

(III) AMULYA CHANDRA ROY Visiting Professor
PhD, University of Kalyani, Kalyani, West Bengal (1980)

Recent Papers (written while at RKMVU)
(1) Fully degenerate cross section for single ionization of Helium by 1 KeV electron in the eikonal approximation. - A.C.Roy , R Dey.(NIMB Vol 267 (2009) Page 2357 - 2360)
(2) (e,3e) and (e,3-1e) differential cross sections for the double ionization of water molecule - A. Mansouri , C. Dal Cappello ,I. Kada , C. Champion , and A.C.Roy , Phys. Letters A 373 , (2009) 3151 -3157.
(3) Fully differential cross section for single ionization of helium by 1 keV electronS in the eikonal approximation - R. Dey and A.C.Roy, NIM B 267 , 2357 (2009)
(4) Ab initio calculation and excitation of helium by electron impact - A.C.Roy , I. Kada, A.Mansouri, C.Dal Cappello, P.A.Hervieus (J.Phys, B 42, 025201 (2009)
(5) Electron impact single ionization of helium with large energy transfer - A.C.Roy , R Dey and C. Dal Cappello (NIM B 266, 242-249 (2008))
(6) Simultaneous ionization and excitation of helium by electron impact - A.C.Roy, R Dey, X.G.Ren and C. Dal Cappello (NIM B 266, 570-576 (2008)

(IV) SIDDHARTHA RAY
Visiting Professor
PhD, McGill University, Montreal, Canada (1972)

Recent Papers (written while at RKMVU)
(1) The study of alpha + 14C cluster states of 18O theough the resonant break-up reaction 12C(18O,14 C) at E(18O) = 94.5 MeV - with S. Adhikari, C.Basu, B.R.Behera, A.K.Mitra, Suresh Kumar and A.Chatterjee - Int. Jour. Mod. Phys. E18(2009) p.1917.
(2) Reaction mechanisms in 16O +40 Ca at an incident energy of E(16O) = 86 MeV through inclusive measurements of a and proton spectra. - S. Ray, Chinmay Basu, S. Adhikari, S. K. Ghosh, S. Roy, B. R. Behera, and S. K. Datta, Phys. Rev. C 76, No.3 (2007) 034609
(3) Reaction mechanisms with loosely bound nuclei 7Li +6 Li at forward angles in the incident energy range

14-20 MeV - S. Ray ,S. Adhikari, C. Samanta, C. Basu, J. Roy, A. Srivastava, K. Ramachandran, V. Tripathi, K. Mahata, V. Jha, P. Shukla, S. Rathi, M. Biswas, P. Roy Chowdhury, A. Chatterjee and S. Kailas, Phys. Rev. C 74, 024602 (2006) [8 pages]

2.3. Computer Science.

(I) SARVOTTAMANANDA
(formerly, Shreesh Jadhav)
PhD, IIT Kanpur (1995)

Recent Papers
(1) Algorithms for Computing Diffuse Reflection Paths in Polygons, Proceedings of WALCOM conference, ISI Kolkata, 2009, Springer LNCS -Sarvottamananda (RKMVU) Subir Ghosh, P. Goswami, A. Maheshwari, S. Nandy, S.Pal

(II) BR. SWATHYPRABHU
M.E. (Integrated) in Computer Science, IISc Bangalore (1996)

3. International Links
3.1. Collaborations Set Up. In the space of the last couple of years, we have already set up a number of fruitful collaborations with USA, UK, Spain and France.
(1) Dr. Indranath Sengupta is engaged in collaborative work with Prof.Philippe Gimenez, Universidad de Valladolid, Spain and with Prof.Hema Srinivasan, University of Missouri, Columbia, USA.
(2) Dr. Kingshook Biswas is engaged in collaborative work with Profs. Arnaud Cheritat and Xavier Buff in Universite Paul Sabatier, Toulouse III, France.
(3) Dr. Kingshook Biswas is engaged in collaborative work with Prof. Ricardo Perez-Marco, Universidad de Madrid, Spain
(4) Swami Vidyanathananda (Mahan Mj) is engaged in collaborative work with Prof. Chris Leininger of University of Illinois, Urbana-Champaign, USA.
(5) Swami Vidyanathananda (Mahan Mj) is engaged in collaborative work with Profs. Saul Schleimer and Caroline Series of University of Warwick, UK.
(6) Bodhisattwa Basu, a PhD student at Ramakrishna Mission Vivekananda University went to Universite Joseph Fourier, Grenoble, France, as an exchange student for a semester (Fall 2008) in Geometry-Topology.
(7) Herve Pajot (hyperbolic geometry) from Grenoble visited us from 26th July till 10th August 2008. The idea is to have some exchange in Geometric Group Theory/Kleinian groups/Hyperbolic geometry etc where there's hardly any presence in the country.

3.2. Visits by our faculty abroad for research purposes. In the recent past, as well as in the near future, several of our faculty have visited or shall visit internationally reputed institutions in USA, UK, France and Germany.
(1) Dr. Indranath Sengupta, spent 6 months at University of Missourie, Columbia, USA on sabbattical from January-June 2007.
(2) Dr. Avijit Mukherjee (Physics) visited Max Planck Institute, Germany, for the period September 2007 till March 2008 for research work in the mathematical aspects of String Theory (3) Swami Vidyanathananda (MahanMj) visitedMathematical Sciences Research Institute, Berkeley, USA for a month (October- November 2007)
(4) Dr. Kingshook Biswas is due to visit Universite Paul Sabatier, Toulouse III, France during May-June 2009.
(5) Swami Vidyanathananda (Mahan Mj) is due to visit University of Warwick, UK from 1-28 May 2009.

(6) Swami Vidyanathananda (Mahan Mj) is due to visit Universite Paris Sud France from 1-30 June 2009.

3.3. Visits by faculty abroad to Belur for research purposes. Since its inception, several reputed scientists have visited our University.
(1) Dr. Lawrence Reeves (Department of Mathematics, University of Melbourne, Australia) visited us for three weeks in February 2006
(2) Prof. Ram Murty (FRS, University of Kingston, Canada) visited us in December 2007
(3) Prof. Kumar Murty (University of Toronto, Canada) visited us in January 2008
(4) Prof Goutami Bhowmik and ProfMarc Bourdon (U. Lille, France) gave a series of twelve lectures on Number Theory and Hyperbolic Geometry respectively during 14, 16, 18, 21, 23, 25 July 2008.
(5) Prof Herve Pajot (UJF, Grenoble, France) gave a series of twelve lectures on Quasiconformal Geometry and Geometric Measure Theory on 28,30 July, 1, 4, 6, 8 August 2008. This was part of an exchange programme we have established with Universite Joseph Fourier, Grenoble, France, in Geometry and Topology.
(6) Prof. Sergio Fenley (University of Florida, USA, presently Princeton University, USA) visited us for a week in November 2008.
(7) Prof. Chee Yap and Prof. Janos Pach (Courant Institute, USA) gave a couple of talks on 17 February 2009.
(8) Prof Markus Pernpointner of Chesmistry Department, Hydelberg University, Germany, visited Physics Department of RKMVU from 11 February 20 February, 2010.

4. Service at the National Level

4.1. Links at the level of faculty. Our faculty has been actively involved in giving talks at a research level at various national institutes.
(1) Swami Sarvottamananda visited Tata Institute of Fundamental Research, Mumbai, BITS, Pilani; IIT Kharagpur and Indian Statistical Institute Kolkata for seminar talks and workshops.
(2) Swami Vidyanathananda visited Harish Chandra Research Institute, Allahabad; Tata Institute of Fundamental Research, Mumbai; Indian Institute of Science, Bangalore; Institute of Mathematical Sciences, Chennai; IIT Kanpur and Indian Statistical Institute Kolkata for seminar talks (including a keynote talk on Foliations at ISI Kolkata) and workshops. He was the chief scientific organizer of a 15-day international conferencecum- workshop on Mapping Class Groups (a topic in Topology) at North Eastern Hill University, Shillong, where speakers came from USA and UK.
(3) Dr. Kingshook Biswas visited Harish Chandra Research Institute, Allahabad; Indian Statistical Institute, Kolkata; and North Eastern Hill University, Shillong for seminar talks.
(4) Dr. Indranath Sengupta visited Harish Chandra Research Institute, Allahabad for a talk in the HRI International Conference in Mathematics.

Faculty that have visited us from national institutes include:
(1) Profs. S. M. Bhatwadekar, T. N. Shorey and T. Venkataramana from Tata Institute of Fundamental Research, Mumbai.
(2) Prof. Amit Roy (retired from Tata Institute of Fundamental Research, Mumbai) who gave a semseter-long course on Algebra
(3) Prof. Harish Seshadri from Indian Institute of Science, Bangalore, who gave a two-month half course on Differential Geometry.
(4) Prof. C. S. Aravinda, Tata Institute of Fundamental Research, Bangalore, who gave a two-month half course on Differential Geometry.
(5) Prof. Sukumar Das Adhikari, Harish Chandra Research Institute, Allahabad, who has given a two-week mini course on Number Theory and several talks. He is an Adjunct Faculty of our University.

A serious collaborative understanding has developed between the mathematics department at our University and the Mathematical Statistics Unit of Indian Statistical Institute Kolkata. Several students of our university have attended classes at Indian Statistical Institute Kolkata. Abhijit Pal, a PhD student at ISI Kolkata, is doing his PhD with Swami Vidyanathananda as his advisor.

5.Student Placement

5.1. 2006-8MScMathematics Batch. The first batch ofMScMaths students have achieved much at the end of the 2-year MSc course, which goes to show that our MSc programme has alrady, in its nascent state, the makings of excellence at least at a national-level.

(1) The topper of the first batch (Pritam Ghosh) has obtained a scholarship to Rutgers University, one of the top 20 universities in mathematics. He had also got scholarships to Stonybrook, Utah and Toronto. He is working on Geometric Group Theory with Prof Lee Mosher (an early student of the Fields' Medalist W.P. Thurston). He also got an NBHM PhD scholarship.

(2) The second student, Bodhisattwa Basu has joined Ramakrishna Mission Vivekananda University for his PhD. He went to Universite Joseph Fourier, Grenoble, France, as an exchange student for a semester in Geometry-Topology.

(3) Panchugopal Bikram is doing his PhD at Institute ofMathematical Sciences, Chennai (IMSc). He has also won the National Board of Higher Mathematics (NBHM) PhD scholarship, the NET-CSIR Junior Research Fellowship and gotten entance into Indian Statistical Institute (ISI) Kolkata. Panchu is virtually a first generation literate and was born and brought up in absolute penury.

(4) Prateep Chakrabarty is doing his PhD at Institute of Mathematical Sciences, Chennai (IMSc). He has also won the NETCSIR Junior Research Fellowship and gotten entance into Indian Statistical Institute (ISI) Kolkata.

(5) Suratno Basu has joined the PhD programme at ISI (Kolkata). He has also won the NBHM PhD scholarship.

(6) Subhabrata Das has joined the PhD programme at ISI Bangalore.

(7) Arnab Sur has got entrance into PhD programmes at ISI (Kolkata) and IIT Kanpur. He has joined IIT Kanpur.

(8) Anirban Bose has got entrance into PhD programme at ISI (Bangalore) and Harish Chandra Research Institute. He has joined ISI Bangalore.

(9) Manoj Chaudhuri has joined the PhD programme at Tata Institute of Fundamental Research (TIFR) Bangalore.

(10) Sabyasachi Dutta has won a CSIR-NET Junior Research Fellowship.

(11) Suman Ahmed has has won a CSIR-NET Junior Research Fellowship.

5.2. 2008-10 MSc Mathematics Batch. There were 6 students in this batch.

(1) 2 out of the 6 have won the NBHM PhD Scholarship

(2) 3 out of the 6 have won the NET Junior Research Fellowships

(3) 2 out of the 6 have qualified at GATE

(4) 2 out of the 6 have been called for an interview at IMSc Chennai

This performance has strengthened our conviction that our students do not lack potential, but rather that the nation lacks the system to tap this talent. Their performance at the time of joining the present MSc programme was probably mediocre, but they have been prepared to enter some of the finest research institutes of the country. The aim and end of starting the MSc programme was to address this issue and (if morning shows the day) there seems to be some degree of success.

It is in terms of creating students who are research-worthy that we are in fact fulfilling the objectives we have set before us, viz.

1) Expose our MSc students to research to make them capable of independent research. The teachers in this programme are active researchers.

2) Provide research institutions with students who are motivated and aware of current research. There

is a severe lack of such students in the fundamental sciences today in India. By filling this gap we are fulfilling a national need in developing technically qualified scientific manpower.

6. Research

Even with the meagre research resources available at our disposal (a library of about 1500 books, virtually no online journals so far and a skeletal staff at present) we have been able to generate research (both in terms of quality and quantity) at an international level. We feel that what we are doing is comparable in quality to research done at some of the best research institutes in the nation. There is no doubt that given the potential of the faculty and the commitment to research that the publications and preprints indicate, a more generous allocation of resources would lead to greater output. This addresses the issue that we had described earier as one of the problems that Indian science faces today, namely that quality of research in India still remains below par compared to developed countries. We reiterate that the School is thus addressing a major concern of the National Knowledge Commission by attaching importance to research "in terms of frequency of publication and the quality of research reflected in the frequency of citation or the place of publication."

Machines never made mankind happy, and never will make. He who is trying to make us believe this, will claim that happiness is in the machine;but it is always in the mind. That man alone who is the lord of his own mind can become happy, and none else. And what, after all, is this power of machinery? Why should a man who can send a current of electricity through a wire be called a very great man, and a very intelligent man? Does not nature do a million times more than that every moment? Why not then fall down and worship nature? What avails it if you have power over the whole of the world, if you have mastered every atom in the universe? That will not make you happy unless you have the power of happiness in yourself, until you have conquered yourself. Man is born to conquer nature, it is true, but the Occidental means by "nature" only physical or external nature. It is true that external nature is majestic, with its mountains, and oceans, and rivers, and with its infinite powers and varieties. Yet there is a more majestic internal nature of man, higher than the sun, moon and stars, higher than this earth of ours, higher than the physical universe, transcending these little lives of ours; and it affords another field of study. There the Orientals excel, just as the Occidentals excel in the other. Therefore it is fitting that, whenever there is a spiritual adjustment, it should come from the Orient. It is also fitting that when the Oriental wants to learn about machine - making he should sit at the feet of the Occidental and learn from him. When the Occident wants to learn about the spirit, about God, about the soul, about the meaning and the mystery of this universe, he must sit at the feet of the Orient to learn.

Swami Vivekananda