

Curriculum Vitae

Dr. Rajendran Kaliaperumal, M.Sc., M.Phil., PhD, PhD (Glasgow)

Laboratory Scientist

Verschuren Centre for Sustainability in Energy and the Environment

Cape Breton University

Sydney, Nova Scotia B1P 6L2, CANADA

T: 902-563-1427 (CS-220)

M: 902-217-5359

Email: raj_kalia@cbu.ca

(On lien)

Associate Professor, Department of Biotechnology

Periyar Maniammai University

Vallam, Thanjavur – 613403, Tamilnadu, INDIA

Mobile Tel: +91-9944495726 Fax: +91-4362 264660

E-mail: rajendrank@pmu.edu, nkraj64@yahoo.co.uk

1. Profile

I have a fierce determination and keen bent of mind towards learning and working in major research areas of chemistry and biochemistry with special reference to energy and environment. The major areas of my research include analytical method development, separation technology, toxicology and heavy metal analysis (mercury, lead and arsenic levels mainly in plants and other matrices). With reference to energy studies, we are developing methods for harnessing ethanol from biomass and other waste. On collaboration with industry, activated carbon testing and characterization work has been started recently. I have a strong interest in developing marker based sensors (using nano-biotechnology approach) that will be useful in monitoring various environmental pollutants.

2. Summary of Work Experience:

Professional Experience:

Experience in Canada:

- Laboratory Scientist: Verschuren Centre for Sustainability in Energy and the Environment, Cape Breton University – Developing and establishing lab capabilities for supporting day-to-day activities of four research chairs of VCSEE and Dean of Research and other researchers in VCSEE & CBU - Developing and participating international research networks – Providing expert advice in equipment investment and operations (Since September 2012).
- Adjunct Professor in the Department of Chemistry, Cape Breton University (Since January 2012)
- Research Associate: Department of Chemistry, Cape Breton University – Molecular Spectroscopy lab, Dr. Dale Keefe group. Working in characterization of kidney stones using diamond ATR-FT-IR and FT-Raman – Crystal growth studies (in-vitro), Molecular Dynamics Simulation and Peptide energy optimization (Gaussian09) work (5 months :July 2011-November 2011).

- Research Assistant: Department of Chemistry, Cape Breton University – Molecular Spectroscopy lab, Dr. Dale Keefe group. Worked in characterization of kidney stones using FT-IR and FT-Raman – Crystal growth studies (in-vitro), Molecular Dynamics Simulation and Dipeptide work (9 months : Nov 2008 – July 2009).
- Co-Op Student – Spectroscopy Branch, ICP-MS Facility of Laboratory Services Branch, Ontario Ministry of Environment, Canada mainly working in LIMS, QA/QC for Drinking water Analysis, Database maintenance and Reporting (March 2005 – May 2005). Scientist in-charge: Teresa Switzer
- Attended co-op programme (12 weeks) in Inter-cultural Neighbourhood Social Services, 3050 Confederation Pkwy, Mezzanine Level, Mississauga ON L5B 3Z6, Programme Developer: Kerry Lambie.
- Attended one day workshop on Monitoring air pollutants using tree lichens, conducted by Citizen Environmental Watch, Toronto.

Experience in India:

- June 2011- Present: Associate professor in Biotechnology, Periyar Maniammai University, Thanjavur, Tamilnadu, India. <https://sites.google.com/a/pmu.edu/rajendrank/>
 - Teaching: a) Instrumental Methods of Analysis b) Professional ethics and human values c) Computational Biology – Bioinformatics d) Proteomics & Genomics- B.Tech., Biotechnology (4 Yrs UG course), M. Phil, Biochemistry & Biotechnology students of our University. Supervising PhD students in Biochemistry, Biotechnology and Bioinformatics.
 - Working in GC-MS (Shimadzu QP2010 plus) and Shimadzu Prominence USLC-HPLC system, Perkin Elmer 2400 series 2 Elemental Analyser. RTX 5S & 1S column in GC-MS.
- Aug 2009 – June 2011: Assistant professor in Biotechnology, Periyar Maniammai University, Thanjavur, Tamilnadu, India.
- December 2006 – June 2008: Assistant Professor, Department of Biotechnology, Periyar Maniammai University (formerly Periyar Maniammai College of Technology) Vallam, Thanjavur, Tamilnadu.

Teaching: a) Instrumental Methods of Analysis b) Professional ethics and human values - B.Tech., Biotechnology (4 Yrs UG course) and c) Environmental Impact Assessment (M.E., Env. Engineering, 2 Yrs PG course).
- Research: Co-investigator in DBT, India sponsored R&D project on “Nano-biochip development”. <http://www.pmu.edu/pmuni/nanobiolab.html>

Project description: Fabrication of Self Assembled Monolayers (SAMs), N-type Si (111) surfaces will be oxidized with the SC1 (Surface Cleaning method) process, and will be modified with octadecyltrichlorosilane (OTS). Oxide dots will be fabricated by applying a bias voltage between the AFM probe and the surface. Amino groups and aldehyde groups will be attached to the

surface for anchoring biomolecules. Topographies after each modification steps will be monitored by AFM.

- Visiting Fellow:Teaching Post Graduate Students of School of Environmental Sciences, Department of Eco-Biotechnology, Bharathidasan University, Tiruchirappalli, India. (July - August 2006)
- Dy. Director (R&D) / Sr. Lecturer (2000-2004): Periyar Maniammai College of Technology for Women, Vallam – Thanjavur, Tamilnadu.
- Involved in establishing Environmental Research Laboratory in Periyar Maniammai College of Tech. For Women, India, under Women’s Environmental Programme (WEP) project, sponsored by Canadian International Development Agency (CIDA) in Collaboration with University College of Cape Breton (UCCB), Nova Scotia and the College of the North Atlantic, (CNA) New Foundland, Canada. Introduced an R&D Journal (PJRD - Periyar Journal of Research and Development), published it quarterly with cooperation from the entire faculty. I was also engaged in teaching Environmental Science and Industrial Biotechnology Courses.
- Undergraduate Level Research Project Guided:
 - Determination of Dose-Dose Rate Effectiveness Factor using Chromosome Aberration method in human blood lymphocytes.
 - Agrobacterium mediated transfer of gene for inducing rhizoid development.
 - DNA finger printing for classification of rice varieties.
 - The study of efficacy of medicinal plants and their active principles on nutrigenomics in streptozotocin induced diabetic rats

Past Teaching Skills:

Microbiology, Cell & Molecular Biology, Pollution Toxicology, Eco-Biotechnology, Environmental Chemistry, Bio-Analytical Instrumentation, Basic Industrial Biotechnology, Proteomics, Genomics, Bio-Informatics, EIA, Remote sensing & GIS, Management Information System (MIS), Instrumental Methods of Analysis.

3. Education:

University and postgraduate studies

Period	University	Title	Major Field of Study
1992-1997	Glasgow (UK)	PhD	Analytical Chemistry
1988-1992	Annamalai (India)	PhD	Marine Pollution studies
1985-1987	Bharathidasan (India)	MPhil	Microbiology
1983-1985	Bharathidasan (India)	MSc	Botany
1980-1983	Madras (India)	BSc	Botany, Chemistry, Zoology

Awards:

Research Associate (1997-'99) – Annamalai University, India
 National Overseas Scholarship to study abroad (1992-'97), Govt. of India

Junior Research Fellowship & Senior Research Fellowship (1988-'91), DBT Project, Govt. of India Awarded - University Rank in Post Graduate Degree (MSc – 1983-'85). Bharathidasan University, Tiruchirapalli, India

4. Professional Training:

- ❖ Working experience in Dr. Dale Keefe's Lab, Dr. Allen Britten's Lab in Cape Breton University, Sydney.
- ❖ Trained in GC-MS for pesticide Analysis from Bharathidasan University, Tiruchirapalli, India.
- ❖ Certified in Radiation Protection from University of Glasgow (UK).
- ❖ Certified in Gas Chromatography – Microbial Identification System from Annamalai University (India).
- ❖ Certified in Remote Sensing and GIS from National Remote Sensing Agency, Hyderabad (India).
- ❖ Trained in Environmental Impact Assessment (EIA) during workshop conducted by Prof. Jim Foulds from University College of Cape Breton, Nova Scotia, New Foundland, Canada.
- ❖ Trained in GIS during workshop conducted by Prof. Sid Parson, College of the North Atlantic, New Found land, Canada.
- ❖ Certified in ISO 9001 – Internal Auditing for Institution from GLC, Germany (India).

Our Research Focus

Herbal Biotechnology Unit - [Periyar Maniammai University](#) - [Department of Biotechnology](#)

Our team has taken up research in herbal technology with reference to urinary calculi (stone) and diabetes control. Locally available medicinal plants are under investigation (compound extraction, purification, structure & function). Animal models are used in testing the formulations. Molecular Dynamic (MD) studies using GROMACS, Docking (ligands & receptors) studies for drugs and pharmacokinetics (ADMET), AFM force curve (experimental & simulation) are few other areas. We aim to foster a interdisciplinary research environment in which biologists, chemists, and technologist can work together to solve exciting new problems; feel free to [contact me](#), if you are interested in working with our lab.

[Dr.K.Rajendran](#), Associate Professor – Team leader

Google Citation Index (<http://goo.gl/1NX6n>)

(<http://scholar.google.co.in/citations?hl=en&user=EsEBIK4AAAAJ>)

Team Members

- Dr. P. Anandagopu – Computational Analysis of Transcriptome and Proteome
- Dr. K. Pazhanichamy - Diabetes control, Analytical (TLC, HPLC, GC-MS, NMR) and animal models
- Dr. M.V.Sarathy – Bio-Linux cluster development, docking, simulation, Bioinformatics tool development
- Dr. K.Manjula - Urinary calculi – Analytical, Thermal (DSC) Microscopic & Spectroscopic (FT-IR, FT-Raman, XRD, SEM, AFM) and animal model studies

B.Tech., Project students (2012)

- D.Sharmila - Gate Scorer - All India Rank: 1365 - Admitted to NIT Rourkela (MTech-Biotech)

- K.A.Guhan - Gate Scorer - All India Rank: 703 - Admitted to NIT Dhurgapur (MTech-Biotech)
- M.Tech., Project student (2012)
M.Harshiny, M.Tech(Nanotechnology) - Final year project titled 'Biomimetic Proteins-Development of anti-cancer targets, selected for Canadian Bureau for International Education (CBIE), on behalf of foreign Affairs and International Trade Canada (DFAIT), under the Canadian Commonwealth Exchange Program, Asia–pacific (formerly GSEP).

B.Tech., Project students (2011)

- K.Aashefa, B. Kunthavai, K.Bhuvaneshwari , M. Kavitha – The study of efficacy of medicinal plants and their active principles on nutrigenomics in streptozotocin induced diabetic rats

Research areas

Marine Drugs, Natural Products Antifouling, Photochemistry, Herbal Formulation, Bioinformatics, Computational Biology & Chemistry, Molecular Dynamic Simulation & Modelling, ADMET, Drug Design, Analytical Method Development, Vibrational Spectroscopic Analysis, Crystal growth and control, Nano-imaging (AFM) & Force Distance Curve analysis.

International Collaborators

Dr. Dale Keefe, Professor & Canada Research Chair, Molecular Spectroscopy, Department of Chemistry, Cape Breton University, Sydney, Nova Scotia, Canada.

http://keefelab.cbu.ca/dkeefe/?page_id=8

Major Research areas

Marine Drugs, Natural Products Antifouling, Photochemistry, Herbal Formulation, Bioinformatics, Computational Biology & Chemistry, Molecular Dynamic Simulation & Modelling, ADMET, Drug Design, Analytical Method Development, Vibrational Spectroscopic Analysis, Crystal growth and control, Nano-imaging (AFM) & Force Distance Curve analysis.

Publications

1. Rajendran, K. and L. Kannan, 1989. The role of heavy metals on phytoplankton. Proceeding of 2nd conference on All India Association of Scientific Tamil, Tamil University (in Tamil), India.
2. Rajendran, K. and C. Govindasamy, R. Kannan, P. Sampathkumar, M. Ganesan, and L. Kannan, 1991. Seaweed resources of the Bay of Bengal on the northern part of Tamil Nadu coast. Seaweed Research and Utilization, 13(2): 123-130.
3. Ganesan, M., R. Kannan, K. Rajendran, C. Govindasamy, P. Sampathkumar and L. Kannan, 1991. Changes in biomass of agarophytes at Pudumadam and Tuticorin, Gulf of Mannar, Tamil Nadu. Seaweed Research and Utilization, 13(2): 109-114.
4. Mohankumar, A., K. Rajendran and L. Kannan, 1991. Copper toxicity to *Chaetomorpha linum* (Muell.) Kuetz. (Cladophorales, Chlorophyta). Seaweed Research and Utilization, 13(2): 115-122.
5. Ganesan, M., R. Kannan, C. Govindasamy, K. Rajendran, P. Sampathkumar and L. Kannan, 1991.

Distribution of trace metals in the seaweeds of the Gulf of Mannar, Bay of Bengal. *Marine Pollution Bulletin*, 22(4): 205-207.

6. Kannan, R., M. Ganesan, C. Govindasamy, K. Rajendran, P. Sampathkumar and L. Kannan, 1992. Tissue concentration of metals in seagrasses of the Palk Bay, Bay of Bengal. *International Journal of Ecology and Environmental Sciences*, 1, 29-34.

7. Rajendran, K. and L. Kannan. 1993. Bloom of *Asterionella glacialis* Castracane in nearshore waters of Covelong (Madras), Bay of Bengal. *Journal of Marine Biological Association of India*, 35(1&2): 224-225.

8. Rajendran, K., P. Sampathkumar, C. Govindasamy, M. Ganesan, R. Kannan and L. Kannan, 1993. Levels of trace metals (Fe, Mn, Cu and Zn) in some Indian Seaweeds. *Marine Pollution Bulletin*, 26(5): 283-285.

9. Rajendran, K. and M. McCartney, 1994. Application of ICP-MS for the determination of ⁹⁹Tc from the marine samples, In: *Heavy metals in the Environment*, Vancouver, Canada, Proc. Int. conf. On 'Heavy metals in the Environment', CEC Consultants, Edinburgh, Scotland, UK. Vol. II.

10. McCartney, M., and K. Rajendran, 1997. ⁹⁹Tc in the Irish Sea - Recent Trends, *Radioprotection - Colloques*, Vol. 32, C2 (1997).

11. Rajendran, K., and L. Kannan, 1998. Modelling coastal parameters: An attempt with wind velocity, *Seshaiyana* 6(2): 1-2.

12. McCartney, M., and K. Rajendran, Historical levels of ⁹⁹Tc in the Irish Sea, IAEA-SM-354/44, International Atomic Energy Agency Publication (1998).

13. McCartney, M., and K. Rajendran, V. Olive, R. G. Busby and P. McDonald, 1999. Development of a novel method for the determination of ⁹⁹Tc in environmental samples by ICP-MS. *Journal of Analytical Atomic Spectrometry* 14: 1849-1852 -pdf available on request.

14. Rajendran, K. and L.Kannan, 1999. Prediction of salinity distribution in the Vellar Estuary, Southeast coast of India, *Seshaiyana*, Vol. 7(2): 7-8.

15. Rajendran, K., S.Jeyalakshmi and N.Ramachandran, 2002. Role of microbes in treatment of waste water, *Proceeding of 11th Scientific Tamil Conference*, Tamil University, Thanjavur – India.

16. Rajendran, K., V. Tamilselvi and N.Ramachandran, 2002. Estimation and importance of ecological foot print analysis, *Periyar Journal of Research and Development*, Vol. 1, (3): 23-27.

17. Rajendran, K., V. Tamilselvi and N.Ramachandran, 2003. Impact assessment using Ehrlich equation for renewable energy technologies, *Periyar Journal of Research and Development*, Vol. 1, (4): 23-26.

18. Rajendran, K., & R. Seethalaksmi, 2007. Biosorption of Copper and Chromium(III) by seaweeds, In: *EMET07 National Conference*, organized by Oxford Engineering college, Trichy, India

19. Tamil Mani Eevera, Kaliyaperumal Rajendran, Saravanan Saradha, Amirthalingam Lakshmi (2008). Analysis of Genetic Variation in Selected Bamboo Species using RAPD. *Tree and Forestry Science and Biotechnology* ,pp.54-56

20. T.Eevera, K.Rajendran, and S.Saradha, 2009. Biodiesel production process optimization and characterization to assess the suitability of the product for varied environmental conditions. *Renewable Energy*, 34(3):762-765
21. Sasikala Kannan, Kaliaperumal Rajendran, Eevera Tamilmani, Senthamari Selvi Venugopalan, Kumaran Shanmugam (India) 2009. Waste Reduction, Nutrient Recovery from Solid Sludge Waste Materials by Vermicomposting, *Dynamic Soil and Dynamic plants*, 3, 97.
22. K. Rajendran and C. Dale Keefe, 2010. Growth and Characterization of calcium hydrogen phosphate dehydrate crystals from single diffusion gel technique, *Crystal Research and Technology*, 45(9), 939-945.
23. Pazhanichamy Kalailingam, Aiswarya Devi Sekara, Jeba Samuel Clement Samuela, Priya Gandhirajana, Yogha Govindaraju, Manjula Kesavan, Rajendran Kaliaperumal, Kumaran Shanmugam and Eevera Tamilmani, (2010) The Efficacy of *Costus igneus* rhizome on Carbohydrate metabolic, hepatoprotective and antioxidative enzyme in streptozotocin (STZ) induced diabetic rats. *Journal of Health Science (Japan)*.57(1):37-46.
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25. S.Chittibabu, M.K. Saseetharan, K.Rajendran and M.Santhanamuthu (2011) Optimization of microwave assisted alkali pretreatment and enzymatic hydrolysis of banana pseudostem for bioethanol production, *IEEE International Conference of Environmental Science and Technology (ICEST 2011)*, Feb 26 – 28, 2011, Singapore – Volume 2, pages 67-71.http://www.ipcbee.net/vol6/no2/rp017_vol.2-F10102.pdf
26. Pradeepa M, Venkatesan P, Menaka E, Rajendran K, Kumaran S (2011) Fabrication of porous silicon nanoparticles to attach Clorgyline for drug delivery, *IEEE International Conference of Bioscience, Biochemistry and Bioinformatics (ICBBB 2011)*, Feb 26 – 28, 2011, Singapore – pages 327-330. www.ipcbee.net/vol5/72-X10020.pdf
27. Pazhanichamy K, Eevera T, Rajendran K and Kumaran S, Antidiabetic and Hypolipimic activity of *Costus igneus* in streptozotocin induced diabetic rats, 8th International Conference on Functional Foods for Chronic diseases: Science and Practice, March 15-17, 2011, University of Nevada, Las Vegas (UNLV), USA (accepted for oral presentation).
28. Pazhanichamy Kalailingam, Rajendran Kaliaperumal, Kumaran shanmugam, Eevera Tamilmani (2011) Efficacy of methanolic extract of *Costus igneus* rhizome on hypoglycemic, Hypolipidimic activity in streptozotocin (STZ) diabetic rats and HPTLC analysis of its active constituents. *IEEE International Conference of Bioscience, Biochemistry and Bioinformatics (ICBBB 2011)*, Feb 26 – 28, 2011, Singapore – pages 318-321.<http://www.ipcbee.net/vol5/70-X10017.pdf>
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32. Pazhanichamy Kalailingam, Rubini Sivasamy, Lavanya Balasubramanian, Pavithra Singaravelu, Bhuvaneswari Kannaian, Kunthavai Balasubramanian, Aashefa Kalandar Naina Mohammed, Kavitha Meenakshisundram, Eevera Tamilmani, Rajendran Kaliaperumal and Kumaran Shanmugam Isolation of antidiabetic compounds from sapogenin extract of *Costus igneus* (N.E.Br) rhizome and its effect on biochemical changes in streptozotocin (STZ) induced diabetic rats, *Pharmaceutical Biology* (June 24, 2011 Submitted).
33. M.Vijayasathy, K.Rajendran and S.Kumaran, FD-CALC: Atomic force microscopy intermolecular force calculator, *Quantum Matters*, 2013 (Accepted January).
34. Saravanan Jothivel, Sankar Ganesh Pitchai Pillai, Anandan Suburayan and Rajendran Kaliaperumal (2011) Copper and Zinc accumulation in few medicinal plants and their commercial product in Tiruchirappalli Gandhi market, Tamilnadu, India, *African Journal of Basic and Applied Sciences*, Vol 3(5): 223-227.
35. P. SANKAR GANESH, K. KANIVALAN, K. RAJENDRAN, D.KUMAR AND S. KUMARAN "Topographic imaging of Mycobacterium smegmatis cell wall treated with ethambutol and rifampicin" - *Int J Pharm Bio Sci* 2013 Apr; 4(2): (P) 255 - 262.
36. K. Manjula, K. Rajendran, T. Eevera and S. Kumaran, Effect of *Costus igneus* stem extract on calcium oxalate urolithiasis in albino rats, *Urological Research* 40, Issue 5 (2012), Page 499-510 DOI: 10.1007/s00240-012-0462-6
37. K. Manjula, K. Pazhanichamy, K. Rajendran, T. Eevera, C. Dale Keefe and S. Kumaran, 2012. Growth characterization of calcium oxalate monohydrate crystals influenced by *Costus igneus* aqueous stem extract, *International Journal of Pharmacy and Pharmaceutical Sciences*, Vol 4, Suppl 1, 261- 270, Impact factor=0.38, <http://www.ijppsjournal.com/Vol4Suppl1/3207.pdf>.
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39. P. Sankar Ganesh, J. Saravanan, P. Krishnamurthy, N. Chandrakala, K. Rajendran (2012) Isolation and Identification of *Vibrio* spp. in diseased *Channa punctatus* from aquaculture fish farm, *Indian Journal of Geo-Marine Sciences*, Vol: 41(2): April 2012.
40. K. Manjula, K. Rajendran, T. Eevera and S. Kumaran, In Vitro Evaluation of calcium Oxalate Monohydrate crystals influenced by *Costus igneus* aqueous extract, *Scandinavian Journal of Urology and Nephrology*, August 2012, Vol. 46, No. 4 : Pages 290-297 <http://informahealthcare.com/doi/pdf/10.3109/00365599.2012.669792> - <http://informahealthcare.com/doi/abs/10.3109/00365599.2012.669792>.
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Journal of Experimental Nanoscience, DOI:10.1080/17458080.2011.577101,
<http://dx.doi.org/10.1080/17458080.2011.577101>

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<http://www.akademai.com/content/mvr22r373183666w/>.

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<http://dx.doi.org/10.1016/j.jmoldx.2012.06.007> Journal of Molecular Diagnostics (Impact factor: 4.2)