VIBIN RAMAKRISHNAN

PROFESSOR

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ACADEMIC PROFILE

Dr. Vibin Ramakrishnan is a Professor of Biosciences and Bioengineering at IIT Guwahati. Vibin is an associate faculty of the Mehta Family School of Data Science & Artificial Intelligence. Dr. Vibin received his Master's in Applied Chemistry from Cochin University of Science and Technology and Ph.D. from the School of Biosciences and Bioengineering, IIT Bombay, in the area of Computational Biophysics. He held roles as a Postdoctoral Research Associate at Rensselaer Polytechnic Institute, New York and a Faculty scientist at IBAB Bangalore before joining the Department of Biosciences & Bioengineering at IITG. He has about 79 publications in reputed international journals and 15 patents, including an international patent and US patent to his credit. He is the principal scientific advisor of two biotech companies operating from India and one in the United States. Vibin is the editorial board member of two reputed journals; the Journal of Controlled Release of Elsevier and Amino acids of Springer. He has served in the editorial board of Scientific Reports of Nature publishing group from 2018-2024. He is an elected fellow of Royal Society of Chemistry, Indian Chemical Society and Royal Society of Biology. The Department of Biotechnology, Govt. of India has awarded Vibin, the Innovative Young Biotechnologist Award (IYBA) in the year 2007-08 to recognize his contributions and innovative approach in biotechnology research.
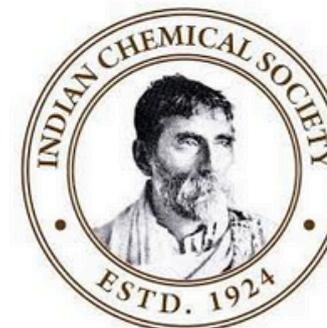
ACADEMIC RECORD (CONCISE)

Publications: 81
Books: 2
Research Papers: 57
Book Chapters: 22

Funded Research Projects: 12
Consultancy Project: 1
Completed: 11
Ongoing: 2

Patents Filed
International: 1
Indian: 14
Computational Tools: 5

PhD Thesis: 11
M.Tech Thesis: 12
B.Tech Dissertation: 14

EXPERIENCE & EDUCATION

FACULTY AT IIT GUWAHATI

· Professor: Indian Institute of Technology, Guwahati – 781039. India (2019 -)

· Associate Professor: Indian Institute of Technology, Guwahati – 781039. India (2015-2019).

· Assistant Professor: Indian Institute of Technology, Guwahati – 781039. India (2011-2015).

POST DOCTORAL RESEARCH

· Faculty Scientist: Institute of Bioinformatics and Applied Biotechnology (IBAB) Bangalore and RGCB Thiruvananthapuram.

· Post-Doctoral Research Associate: Center for Bioinformatics, Biology, Jonsson Rowland Science Center, Rensselaer Polytechnic Institute, Troy NY – 12180, USA

MASTER OF SCIENCE AND PH.D.

- Ph.D.: Indian Institute of Technology, Bombay, Powai-400076 India
  Doctoral Thesis: Stereo chemical Effects in Protein Structure Folding and De novo Design
- Master of Science: in Applied Chemistry. Cochin University of Science and Technology, Kochi, India.

RESEARCH INTERESTS

AREAS OF RESEARCH

Network medicine, Computational Biology, Drug Delivery, Functional Peptides

AWARDS / SCHOLASTIC ACHIEVEMENTS

AWARDS

- FRSC: Fellow of Royal Society of Chemistry, UK
- FRSB: Fellow of Royal Society of Biology, UK
- FICS: Fellow of Indian Chemical Society, Kolkata, India.
- IYBA Fellow: Innovative Young Biotechnologist Award Extension (IYBA 2011-12), Dept. of Biotechnology, Ministry of Science and Technology, Govt. of India.
- IYBA Fellow: Innovative Young Biotechnologist Award (IYBA 2007-08), Dept. of Biotechnology, Ministry of Science and Technology, Govt. of India.
- Post-Doctoral Fellowship funded by National Science Foundation, United States.
- Cochin University Merit Scholarship by CUSAT for top two students in each discipline

EDITORIAL BOARDS

EDITORIAL BOARDS

1. Journal of Controlled Release, Publisher: Elsevier, Impact Factor: 10.8
2. Amino acids, Publisher: Springer, Impact Factor: 2.4
3. Scientific Reports (2018-2024), Publisher: Nature Publishing Group, IF: 3.9

PUBLICATIONS (selected)

- 1. Yvonne Christian, Amay Sanjay Redkar, Naveen Kumar, Shine Varghese Jancy, Aneesh Chandrasekharan, T R Santhoshkumar and Vibin Ramakrishnan*, Structural Regression Modelling of Peptide based Drug Delivery Vectors for the Treatment of Triple-Negative Breast Cancer. (2024) **Drug Delivery and Translational Research**. DOI:10.21203/rs.3.rs-4294444/v1. Impact Factor: 5.671. Publisher: Springer

- 2. Gaurav Jerath, Pramod Darvin, Yvonne Christian, Vishal Trivedi, T. R. Santhosh Kumar and Vibin Ramakrishnan*. Delivery of Small Molecules by Syndiotactic Peptides for Breast Cancer Therapy. **Molecular Pharmaceutics** (2022) DOI: acs.molpharmaceut.2c00238 Impact Factor: 5.364. Publisher: American Chemical Society

- 3. Sasidharan, Sayandeep Ghosh, Rishi Sreedhar, Kalpana Kumari, Subhash Thota, and Vibin Ramakrishnanan* Anisotropic Ferromagnetic Organic Nanoflowers, **Journal of Physical Chemistry C** (2022) DOI: 10.1021/acs.jpcc.2c01462. Impact Factor: 4.177. Publisher: American Chemical Society

- 4. Ruchika Goyal, Gaurav Jerath, Akhil R., Aneesh Chandrasekharan, Eswara Rao Puppala, Srikanth Ponneganti, Anupam Sarma, V.G.M. Naidu, T. R. Santhoshkumar, and Vibin Ramakrishnanan* "Geometry Encoded Functional Programming of Tumor Homing Peptides for Targeted Drug Delivery", **Journal of Controlled Release** (2021) DOI: 10.1016/j.jconrel.2021.03.0101 Impact Factor: 11.467. Publisher: Elsevier

- 5. Aparna Rai, Vikas Kumar, Gaurav Jerath, C. C. Kartha & Vibin Ramakrishnan Mapping drug-target interactions and synergy in multi-molecular therapeutics for pressure-overload cardiac hypertrophy, **npj Systems Biology and Applications** (2021) DOI: 10.1038/s41540-021-00171-z Impact Factor:4.0. Publisher: Nature (npj)

- 6. Ruchika Goyal, Gaurav Jerath, Aneesh Chandrasekharan, Yvonne Christian, T. R. Santhoshkumar, and Vibin Ramakrishnanan*, Molecular hybridization combining tumor homing and penetrating peptide domains for cellular targeting, **Drug Delivery and Translational Research** (2021) DOI : 10.1007/s13346-021-01035-z. Impact Factor: 5.671. Publisher: Springer

- 7. Jahnu Saikia, Gaurav Pandey, Sajitha Sasidharan, Ferrin Antony, Harshal B. Nemade, Sachin Kumar, Nitin Chaudhary, and Vibin Ramakrishnan*. Electric Field Disrupts Amyloid Aggregation; Potential Non-invasive Therapy for Alzheimer's Disease. **ACS Chemical Neuroscience**. (2019), doi:10.1021/acschemneuro.8b00490. Impact Factor: 5.78. Publisher: American Chemical Society

- 8. Gaurav Jerath, Ruchika Goyal, Vishal Trivedi T.R. Santhoshkumar and Vibin Ramakrishnan*. Syndiotactic Peptides for Targeted Delivery. **Acta Biomaterialia**. (2019), doi: 10.1016/j.actbio.2019.01.036. Impact Factor: 10.663. Publisher: Elsevier

- 9. Rahul Metri, Gaurav Jerath, Govind Kailas, Adityabarna Pal & Vibin Ramakrishnan*. Structure Based Barcoding of Proteins. **Protein Science** (2014) 23, 117-120. Impact Factor: 6.725. Publisher: Wiley

- 10. Vibin Ramakrishnan, Saeed Salem; Saipraveen Srinivasan, Mohammed Zaki, Suzanne Mathews, Wilfredo Colon and Christopher Bystroff. Developing a detailed mechanistic model for protein unfolding. **Proteins: Structure Function & Bioinformatics** (2012), 80, 920-934. Impact Factor: 3.756 Publisher: Wiley

- 11. Vibin Ramakrishnan; Ranjit Ranbhor and Susheel Durani. Existence of Specific "Folds" in Polyproline-II Ensembles of an Unfolded Alanine Peptide Detected by Molecular Dynamics. **Journal of the American Chemical Society** (2004) 126, 16332-16333. Impact Factor: 15.420. Publisher: American Chemical Society

TEACHING

UNDERGARDUATE COURSES (BIOSCIENCES & BIOENGINEERING)

- BT 101 Modern Biology*
- BT 301 Bioinformatics and Computational Biology*
- BT 305 Computational Biology
- BT 205 Biophysics*
- BT 310 Bioinformatics and Computational Biology Laboratory*

GARDUATE COURSES (BIOSCIENCES & BIOENGINEERING)

- BT 501 Biotechniques
- BT 510 (L) Bio-techniques Laboratory
- BT 617 Concepts and Methods in Proteomics
- BT 601 Analytical Biotechnology
- BT 530 (L) Experimental Techniques in Bioengineering Laboratory

UNDERGRADUATE COURSE (DATA SCIENCE & ARTIFICIAL INTELLIGENCE)

- DA 461 Bioinformatics (Undergraduate 4th year)

COMPUTATIONAL TOOLS

COMPUTATIONAL TOOLS DEVELOPED

- 1. **Protein Barcode**
- Description: Tool structure based barcoding of proteins (MID, IIT Guwahati)
- Reference: Structure Based Barcoding of Proteins Rahul Metri, Gaurav Jerath, Govind Kailas, Nitin Gachhe , Adityabarna Pal & Vibin Ramakrishnan (2014) Protein Science 23:117–120 (Cover page)

- 2. Basic Protein Engineering Toolkit (**bPE Toolkit**, MID IIT Guwahati)
- Description: Consists of six useful protein modeling tools
- Reference: bPE toolkit:Toolkit for Computational Protein Engineering Gaurav Jerath, Prakash K. Hazam and Vibin Ramakrishnan. Systems and Synthetic Biology. (2014) 8:337–341.

- 3. **Geofold:** Protein Unfolding Pathway prediction server (Bystroff Lab, RPI New York)
- Description: Tool for predicting protein unfolding pathways
- Reference: Vibin Ramakrishnan, Saeed Salem; Saipraveen Srinivasan, Mohammed Zaki, Suzanne Mathews, Wilfredo Colon and Christopher Bystroff. Proteins: Structure Function & Bioinformatics (2012), 80, 920-934.

- 4. **IDEAS** (Durani Lab, IIT Bombay)
- Description: Software for protein inverse design
- Reference: Ranbhor Ranjit, Anil Kumar, Abhijit Tendulkar, Kirti Patel, Vibin Ramakrishnan*, and Susheel Durani. IDeAS: Automated Design Tool for Hetero-chiral Protein Folds. Physical biology. (2018), doi::10.1088/1478-3975/aacdc3

- 5. **Time Piece model** for Virtual Activity Profiling of Drug molecules (Vibin Ramakrishnan Lab, IBAB Bangalore)
- Description: Tool for virtual activity profiling of drugs.
- Reference: Aimy Sebastian, Andreas Bender and Vibin Ramakrishnan*; Virtual Activity Profiling of Bioactive Molecules by 1D Fingerprinting. Molecular Informatics (2010) 29, 773-779.

INDUSTRIAL ASSOCIATIONS/ CONSULTANCY

INDUSTRY & CONSULTANCY

AKSIVIAR Technologies LLP
Aluva, Kochi, India
Role: Principal Scientific Consultant

IVORY 7 LLC
Hawaii, United States
Role: Principal Scientific Consultant

PEPTHERA LABORATORIES PVT. LTD.
Ahmedabad, India
Specific Role: Principal Scientific Advisor

SEVIT HEALTHCARE PVT. LTD
Mumbai, India
Specific Role: Member, Advisory Board

OUTREACH

OUTREACH (TEACHING)

SA Course on Meditation and Heartful Communication

The meditation and heartful communication program is offered as a non-credit SA course in the second and third semesters of the Undergraduate program of IITG. The course has fifteen hours of Meditation and fifteen hours of Heartful communication (HC). Heartful Communication weaves together Heartfulness system of meditation and Rosenberg's Non-violent communication, offering beautiful tools and practices to connect with our 'self' and others. It is primarily based on a communication system developed by clinical psychologist Marshall Rosenberg widely known as "Non-Violent Communication". This introductory course will help students to live a more disciplined and productive life, stay away from disruptions like drug abuse and to communicate more effectively in their professional years. I am offering this as an additional component apart from my assigned teaching responsibilities.

OUTREACH (RESEARCH)

AUSHADHI (Open Innovation Platform for Healthcare)

AUSHADHI platform is meant to develop the scientific ideas of common people by supporting them with scientific and technological expertise of IITG faculty community. Our primary focus is in the area of healthcare. Presently we are working with Luko Aukhodi Sikitsya Sewa (LASS) Ashram, Dhemaji, Assam for validating few therapeutic practices in tribal medicine.

aushadhi
Open Innovation Platform for Healthcare

Coordinating Faculty: Vibin Ramakrishnan
URL: https://www.iitg.ac.in/aushadhi/index.html

PROFESSIONAL AFFILIATIONS

National Academy of Sciences. India
Royal Society of Chemistry, UK
Biophysical Society
Controlled Release Society of India
Protein Society
Indian Chemical Society, Kolkata

American Chemical Society
Royal Society of Biology, UK
American Peptide Society
Society of Biological Chemists
The International Society of
Indian Chemical Society for Computational
Biologists (ISCB)

BOOKS
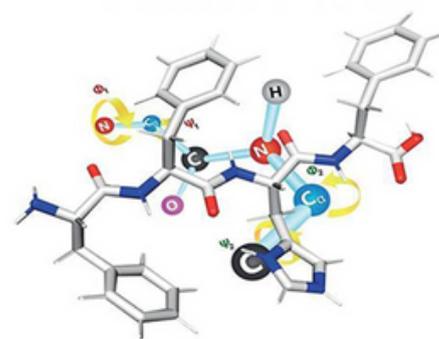
De Novo Peptide Design
Principles and Applications

Edited by
Vibin Ramakrishnan
Kirtikumar Patel
Ruchika Goyal

AP

Springer Protocols

Vibin Ramakrishnan *Editor*

Biophysical Characterization of Functional Peptides

Humana Press
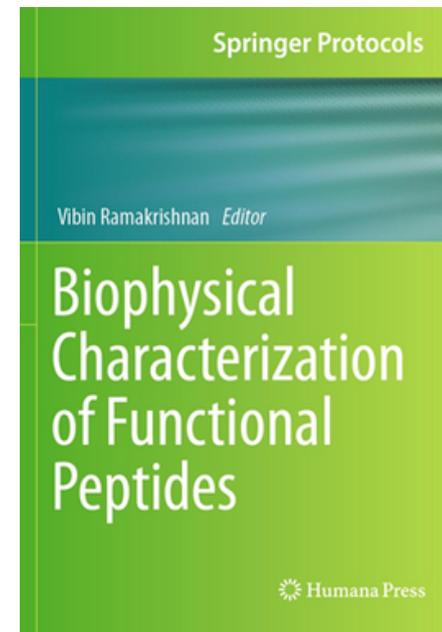
MOLECULAR INFORMATICS & DESIGN LABORATORY
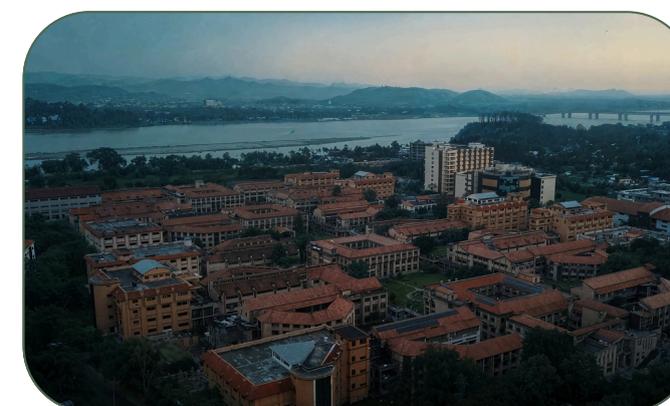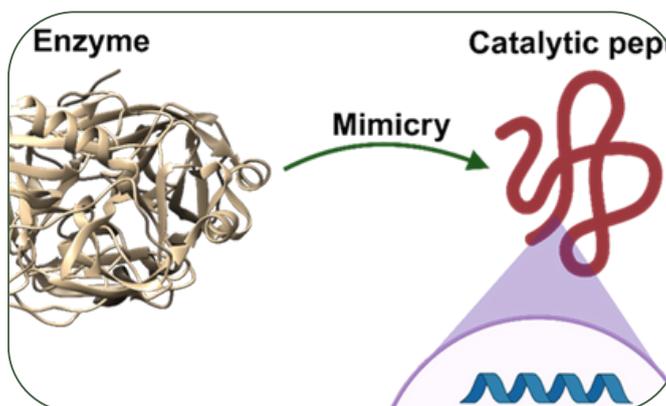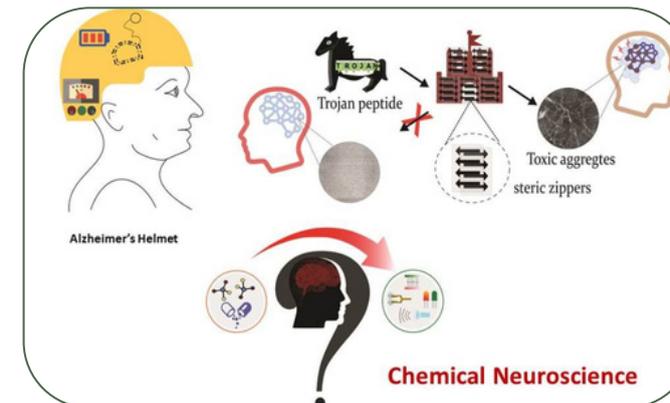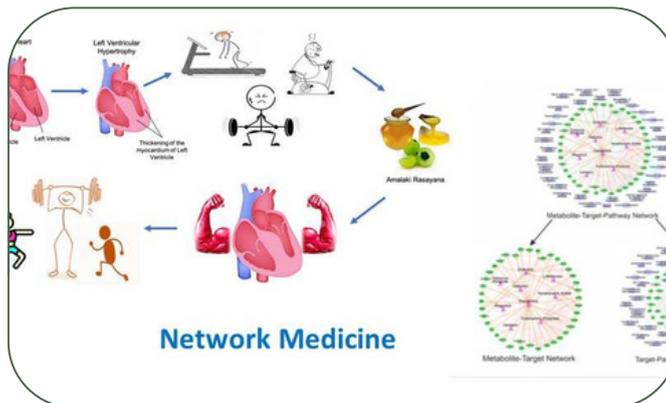
Molecular Informatics and Design group integrates diverse disciplines of science and engineering in understanding the efficacy and mode of action of drugs and the design and development of advanced materials. Our approach to a research problem is 'idea centric' with a clear emphasis on the design phase, adopting modeling and informatics tools.

In our Network Medicine projects, we combine the principles of network sciences, systems biology, proteomics, and synthetic organic chemistry to understand the causes of human diseases, efficacy of treatment options and their mode of action..In our Bionanotechnology projects, we adopt a reductionist approach in understanding the interaction between molecules resulting in the formation of assembled architectures at nano and micro scale, and further employ it in the design of future materials. An information based modeling approach has been employed in the design and characterisation of tumor homing and cell penetrating molecules to test their efficacy as future Drug Delivery vehicles

MOLECULAR INFORMATICS AND DESIGN LAB INFOGRAPHIC
(Key Technologies)