Department of Chemistry

Faculty of Science / University of Peradeniya

Dr. R. J. K. Udayana Ranatunga

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Senior Lecturer

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About Me

I am a researcher and educator with interests in nanotechnology, materials science, and interdisciplinary scientific research. My doctoral work at the University of Texas at Dallas focused on computational chemistry, and particularly on coarse-grained molecular dynamics simulations. The application of computational and theoretical chemistry has lead me on many projects and areas spanning nanotechnology, surface science and biophysics. My current academic work focuses on connecting fundamental scientific concepts with practical and emerging applications, particularly in materials and nanoscience. I am passionate about creating engaging learning experiences for students, and encouraging critical thinking and curiosity in science. I actively work with students in developing research ideas, scientific and communication skills, and world ready competencies. I enjoy fostering collaborative and innovation-driven learning environments, and working in teams adopting these values.

Higher Education Qualifications

PhD	MSc	BSc
University of Texas at Dallas - USA (2012)	University of Texas at Dallas - USA (2009)	University of Peradeniya - Sri Lanka (2006)

Awards, Scholarships, Memberships & Fellowships

Nothing to show under this subheading !!!

Positions Held

- Senior Student Councellor- (2013 – 2015)
- Director - Science-Industry Interaction Cell- (2019-2022)
- Chair - Student Academic Advisory Committee (SAAC)- (2022 - 2026)
- Faculty Representative - SGBVC- (2023 - Present)

My Teachings

- CHE1081: Elementary Chemistry Laboratory I
- CHE2282: Organic Chemistry Laboratory
- CHE2313: Physical Chemistry I
- CHE3812: Computer Applications and Instrumentation
- CHE4332: Molecular Modeling
- CHE4352: Chemistry Application in Nanoscience

Research Interests (Research Fields/ Projects)

My research focus is mainly on the computational investigation of material, particularly 'soft' nanoparticles and biphasic fluid systems. My research group has strong expertise in a wide range of molecular dynamics simulations using both all-atom and coarse grained force fields. We run conventional simulations as well as carry out parameterization, free energy calculations and non-equilibrium simulations. We also have experiene in running a variety of electronic structure calculations depending on the project.

Ongoing Research and Projects

- **The study and modeling of dendrimers, and their drug loading capacity**
- **The energetics and interactions of cyclodextrin inclusion complexes**
- **Cell penetrating peptides and their interactions with cargo and cellular membranes**
  (Collaboration with Prof. D. Nedra Karunaratne)
- **Photodynamics and Energy levels of substituted furylfulgides**
  (collaboration with Dr. Champika V. Hettiarachchi)
- **Graphene oxide membranes for water filteration**
- **Therapeutic Mechanisms of Traditional Medicine**
- **Coarse-Grained Force-field development**
- **Using Computer Assisted Teaching/learning for Chemistry Education**

Key Publications

A Molecular Docking Study J. Biophys. - (2017)

Trends in the Binding of Cell Penetrating Peptides to siRNA:

Soft Matter - (2011)

Molecular Dynamics Study of Nanoparticles and Non-Ionic Surfactant at an oil/water interface.

Conferences

Nothing to show under this subheading !!!

My Publications

Please goto the website.

https://sci.pdn.ac.lk/chemistry/staff/Udayana-Ranatunga