Curriculum Vitae

Personal profile:
Full Name: Dr. Pradipkanti Devi Lairenjam
Date of Birth: February 1st, 1988
Nationality: Indian
URL for google scholar: `https://scholar.google.de/citations?hl=de&user=cLyfMg4AAAAJ`

Education:

2012 - 2018: PhD in Physics,
Department of Physics
Indian Institute of Technology Madras, Chennai, India
Thesis title: **Novel properties of polymers under confinement**
Supervisor: Prof. Dillip K. Satapathy
CGPA: 8 out of 10

2008 - 2010: M.Sc. in Physics,
Department of Physics
Manipur University, Imphal, India
Marks: 81.4% (First class with distinction, Gold Medal)

2005 - 2008: B.Sc. in Physics,
Department of Physics
D. M. College of Science, Imphal, India
Marks: 78.7% (First class with distinction, Gold Medal)

Experience:

January, 2019 - December, 2020: Postdoctoral Fellow,
Institute of Physics,
Albert-Ludwig-University of Freiburg, Freiburg, Germany
Research area: To investigate dewetting dynamics of thin polymer films fabricated from ultralow molecular weight

Current position:

From January 28th, 2021 onwards: Postdoctoral Fellow,
Chemistry and Physics of Materials Unit,
JNCASR, Bengaluru, India
Research area: Confinement of light in structured systems

Technical skills:
Hands-on experience on the following equipment:

- Optical microscope
- Atomic Force Microscope (AFM)
- Confocal Microscope
- X-ray Reflectometer (XRR)

- Spectroscopic Ellipsometer (SE)
- Dielectric Relaxation Spectrometer
- Raman Spectrometer
- UV Spectrometer
- Photoluminescence Spectrometer
- Nano indenter
- Spin coater

Skills in Data analysis:

- Analysis of optical micrographs using ImageJ software and AFM images with JPK SPM software
- Well-trained in simulation of XRR data using various software, such as GenX, GlobalFit, Matlab
- Well-experienced in fitting SE data using CompleteEASE

Computer skills:

- Well-versed in Matlab, Latex and Origin.

Worked in the following areas during PhD:

- **Effect of physical aging on the structure and glass transition of confined polymers:** In this work, I discuss the effect of physical aging on structure and glass transition of polystyrene thin films. The sufficiently aged polystyrene film is found to exhibit prominent stratified structure and two glass-like thermal transitions. Since freshly prepared film does show only one transition and there is no overshoot in the thermal coefficient of expansion vs. temperature plot, the two transitions observed in the significantly aged film is attributed to the two relaxation processes involved in two-stage equilibration mechanism. In addition, anomalous thermal expansion is observed in the regime between the two glass-like thermal transition temperatures.

- **Effect of molecular weight polydispersity on glass transition and densification in confined polystyrene:** The significantly low bulk glass transition temperature of polystyrene possessing bimodal molecular weight distribution and further suppression of the glass transition temperature when the polymer is confined in the form of thin films are discussed in this work. Moreover, the width of the glass transition temperature is found to be enhanced with confinement. Furthermore, the so-called "densification", where the density of the confined polymers increases with decrease in film thickness, is presented.

- **Water desorption from biopolymer thin films:** The behavior of water desorption from confined biopolymer is discussed in detail in this work. The water desorption rate occurs at different rates and the characteristic temperatures at which the desorption rates change are found to couple with film thickness.

- **Swelling kinetics of optically anisotropic biopolymer films: Effect of confinement, pH and cross-linking:** Swelling kinetics alongside various factors affecting swelling of optically anisotropic biopolymer films are investigated in this work. The optical anisotropy decays exponentially with increasing thickness due to swelling of the film. Besides, swelling kinetics of the confined biopolymer is found to be remarkably affected by various factors such as film thickness, cross-linking and pH of the solvent.

Research interests: Experimental Soft Condensed Matter Physics

- To study the fascinating properties, namely, swelling/deswelling, glass transition temperature, chain relaxation, wetting/dewetting of confined polymers.
- To explore the importance of soft matter in the state-of-art technology.

Mentoring:

- During my PhD, I have mentored six students which includes one M. Tech student on 1 year research program, one M.Sc. student on 6 months research project and four summer internship students for 3 months. I have also assisted for 6 months in conducting B.Tech laboratory classes at IIT Madras, India during my PhD program.
- During postdoc in Albert-Ludwig-University of Freiburg, Germany, I have mentored one master student on the project "Dewetting studies of polymer blend films".

Academic achievements:

- Gold medalist in B.Sc. (Physics) in 2008
- Gold medalist in M.Sc. (Physics) in 2010
- Gold medal for highest mark in Condensed Matter Physics in 2010
- Qualified Graduate Aptitude Test in Engineering (GATE) in 2012
- Best poster award in International Conference on Condensed Matter and Applied Physics, ICC-2015
- Best poster award in international meeting CompFlu-2019
- Achieved SERB National Post Doctoral Fellowship 2020

Publications:

1. **L. Pradipkanti**, Sathish K. Sukumaran and Dillip K. Satapathy, "Modulation of Optical Anisotropy in Chitosan Thin Films: Role of Swelling", *Macromolecules* **54**, 10931-10942 (2021).

2. Mulama, A.A., Roumpos, K., **L. Pradipkanti**, Oduor, A.O. and Reiter, G., "Rheological Properties of Blends of Isotactic Polystyrene–Isotactic Poly (para-methylstyrene) Films Derived from a Comparative Dewetting Study", *Macromolecules*, **53**, 9122-9130 (2020).

3. **L. Pradipkanti** and Dillip K. Satapathy, "Water desorption from a confined biopolymer", *Soft Matter*, **14**, 2163 (2018).

4. **L. Pradipkanti** and Dillip K. Satapathy, "Effect of bimodal molecular weight distribution on glass transition of confined polystyrene", *Thin Solid Films*, **651**, 18 (2018).

5. **L. Pradipkanti**, M. Chowdhury and Dillip K. Satapathy, "Stratification and two glass-like thermal transitions in aged polymer films", *Phys. Chem. Chem. Phys.*, **19**, 29263 (2017).

6. **L. Pradipkanti** and Dillip. K. Satapathy,"Confinement Induced Densification in Supported Unentangled Polymer Film", *AIP Conf. Proc.*, **1832**, 040029 (2017).

7. M. Battabyal, B. Priyadarshini, G. Krishnan, **L. Pradipkanti**, Dillip K. Satapathy and R. Gopalan, "Tailoring the optical phonon modes and dielectric properties of nanocrystalline SrTiO3 via Yb doping", *Mater. Res. Express*, **5**, 046301 (2018).

8. M. Battabyal, B. Priyadarshini, **L. Pradipkanti**, Dillip K. Satapathy and R. Gopalan, "Phase stability and lattice thermal conductivity reduction in CoSb3 skutterudites, doped with chalcogen atom", *AIP Adv.*, **6**, 075308 (2016).

9. Mandakranta Ghosh, **L. Pradipkanti**, Vikas Rai, Dillip K. Satapathy, V. Pramitha, Manu Jaiswal, "Confined water layers in graphene oxide probed with spectroscopic ellipsometer", *Appl. Phys. Lett.*, **106**, 241902 (2015).

Presentations in Conferences:

1. **L. Pradipkanti** and Günter Reiter, "*Symmetry breaking in dewetting of miscible polymer blend films*", CompFlu 2019, IISER Bhopal, Madhya Pradesh, India, 5^{th} - 7^{th} December, 2019 (both Oral and Poster Presentations, **Best Poster Award**).

2. **L. Pradipkanti** and Dillip K. Satapathy, "*Water adsorption and desorption kinetics in chitosan thin films*", Complex Fluids - Compflu @ IITM 2017, IIT Madras, Chennai, Tamil Nadu, India, 18^{th} - 20^{th} December, 2017 (Poster Presentation).

3. **L. Pradipkanti** and Dillip K. Satapathy, "*Confinement effects in Biopolymer thin films*", 10^{th} Liquid Matter Conference, Cankarjev dom Cultural and Congress Centre in Ljubljana, Slovenia, 17^{th} - 21^{st}July, 2017 (Poster Presentation).

4. **L. Pradipkanti** and Dillip K. Satapathy, "*Swelling of confined biopolymer*", Fourth International Conference on Nanostructured Materials and Nanocomposites, Mahatma Gandhi University, Kottayam, Kerala, India 10^{th} - 12^{th} February, 2017 (Poster Presentation).

5. **L. Pradipkanti** and Dillip K. Satapathy, "*Confinement Induced Densification in Supported Unentangled Polymer Films*", 61st DAE Solid State Physics Symposium, KIIT University, Bhubaneswar, Odisha, India, 26^{th} - 30^{th} December, 2016 (both Oral and Poster Presentations).

6. **L. Pradipkanti** and Dillip K. Satapathy, "*Swelling of Biopolymer thin films*", Complex Fluids - Compflu, IIIT Hyderabad, Andhra Pradesh, India, 12^{th} - 14^{th} December, 2016 (Poster Presentation).

7. **L. Pradipkanti** and Dillip K. Satapathy, "*Confinement effects in ultrathin polymer films*", Complex Fluids - Compflu, IISER Pune, Maharashtra, India, 2^{nd} - 4^{th} January, 2016 (Poster Presentation).

8. **L. Pradipkanti** and Dillip K. Satapathy, "*Multiple Glass Transition Temperatures in ultrathin Polymer Films: A Spectroscopic ellipsometry and Raman Spectroscopy study*", International Conference on Condensed Matter and Applied Physics, ICC-2015, Bikaner, Rajasthan, India, 30^{th} - 31^{st} October, 2015 (**Best Poster Award**).

9. **L. Pradipkanti** and Dillip K. Satapathy, "*Confinement induced densification of ultrathin polystyrene films*", the 18^{th} National Seminar on Ferroelectrics and Dielectrics (XVIII NSFD 2014), Manipur University, Imphal, India, 3^{rd} - 5^{th} November, 2014 (Poster Presentation).