DHIMAN BHATTACHARYYA, Ph.D.

276 Massachusetts Avenue, Apt 312, Arlington, MA 02474
☎ 817-676-5633 (*M*), ✉ dhiman75@gmail.com, dhimanb@mit.edu

OBJECTIVE

To apply my skills to develop successful new products and build a career to lead a multidisciplinary research and development team.

SKILLS AND TRAINING

- 3+ years of hands-on experience in surface engineering, thin films and surface characterization.
- 3+ years of hands-on experience in materials processing and parameter optimization: CVD, PECVD, PVD, E-Beam, spin coating, and dry etching.
- Innovative in selection and formulation of the precursor molecules for best end products.
- Design, assembly, operation and maintenance of vacuum chambers.
- Clean room experience.
- Fabrication of functional coatings, implementation and integration of materials into devices.
- Experience in design of experiments and statistical data analysis.
- Strength in innovation, leadership, communication, program management, and problem solving.
- Materials characterization techniques: FT-IR, Raman and UV-Vis spectroscopies, XRD, SEM, EDX, TEM, XPS (ESCA), contact angle goniometry, AFM, fluorescence and optical microscopies, 4-point probe and in-situ laser interferometry.
- Writing grants, publications and reports, and presentation of ideas and research.

EXPERIENCE

Postdoctoral Associate, Massachusetts Institute of Technology, Cambridge, MA. 09/2009 – present

- Fabricated and characterized conductive polymers and copolymers for solar cells, LED and biosensor applications.
- Conceptualized and developed an all-in-one CVD reactor that is able to simultaneously synthesize and deposit both organic and inorganic thin films, avoiding exposure of the substrate to the ambient.
- Innovated a flexible, inexpensive chemiresistive biosensors for detection of food pathogens. Resolved the portability and sensitivity issues and significantly reduced the detection time from days to minutes, in contrast to the state-of-the art techniques. FDA is now working on this project.
- Conceptualized and initiated work on low band-gap polymer. Chemically vapor deposited polyselenophene of 1.72eV optical band gap that can be easily printed and patterned as thin films.
- Conceptualized and fabricated ultra-high aspect ratio (50:1) nanoforests of -OH functional conductive copolymers to significantly improve the surface area at the multilayered device interfaces.

Postdoctoral Associate, Washington University, St. Louis, MO. 01/2009 – 10/2009

- Identified efficient conditions to prepare self-assembled monolayers of phosphonic acids on metal oxide surfaces. Established conditions of e-beam deposition of metals and metal oxides.

Research Assistant, The University of Texas at Arlington, TX. 09/2005 – 12/2008

- Fabricated and characterized polymer thin films synthesized by plasma-enhanced chemical vapor deposition (PECVD) or pulsed plasma polymerization for biomedical and electrical applications.
- Improved the aortic endothelial cell adhesion by >200% on stent surfaces by optimizing surface chemistry and thickness of polymer films. This improvement reduced stent-related complications.
- Designed and fabricated flexible, ultrathin organic dielectrics with κ ~6.5 which is at the high end for pure organic polymer thin films. Fabricated transistor by using this polymer thin films.
- Conceptualized and developed thermoresponsive hydrogels. Finely tuned lower critical solution temperature by modifying plasma conditions. Synthesized ~10nm silver nanoparticles inside the hydrogels to thermoresponsively release silver which immediately killed bacterial cells.
- Designed and improved the composite properties by tailoring the organic-inorganic interfaces with functional polymer thin films.

Graduate Intern, Aeonclad Coatings LLC. Austin, TX. **01/2008 – 05/2008**

- Developed antimicrobial polymer coating for catheters and dentures with 99.9999% efficacy.
- Improved the lubricity of catheters by 20% by employing vapor phase polymer coating.
- Functionalized tissue culture substrates with plasma polymer thin films for improved cell culture.

Practical Trainee, Phillips Carbon Black Limited, Durgapur, India. **09/2001 – 10/2001**

- Formulated rubber compounding recipe with carbon blacks; evaluated their mechanical properties.
- Assisted in the evaluation of company's ISO-9001 standard and the EHS measures in the facilities.

EDUCATION

Ph.D., *Chemistry*, The University of Texas at Arlington, USA 2008
"*Plasma surface modifications for biomedical and electrical applications*"
M.Tech., *Polymer Science & Technology*, University of Calcutta, India 2003
"*Synthesis and characterization of chelating polymer resins*"
B.Tech., *Polymer Science & Technology*, University of Calcutta, India 2001
B.Sc., *Chemistry* (Honors), University of Calcutta, India 1998

HONORS

Research Fellowship administered by Oak Ridge Institute for Science & Education (ORISE) through an interagency agreement between DOE and FDA. 2012
Recognized by *Cambridge Who's Who Registry* among Executives and Professionals. 2009
Graduate Outstanding Research Award '07-'08, The University of Texas at Arlington, TX. 2008
Annual NIH National Graduate Student Research Festival Participation. Bethesda, MD. 2007
STEM Fellowship, The University of Texas at Arlington, TX. 2005-2008
Hermann's Fellowship, The University of Texas at Arlington, TX. 2003-2007
National Scholarship, Higher Secondary Education, Government of India. 1994

PATENTS, PUBLICATIONS & PRESENTATIONS

Patents: U.S. and International Patents applied and issued: 7 including the following:

1. **D. Bhattacharyya**, K. K. Gleason, M. C. Barr. "Single-Unit Reactor Design for Combined Oxidative, Initiated and Plasma-Enhanced Chemical Vapor Deposition." *U.S. Patent Appl.* **2012***, 13/407,075*.
2. **D. Bhattacharyya** and Karen K. Gleason. "Biosensors." *U.S. Patent Appl. 2011, 61/522,486* and *PCT Int. Appl.* **2012***, PCT/US12/46425*.
3. R. B. Timmons, D. S. Wavhal, **D. Bhattacharyya,** N. Mukherjee. "Covalently Functionalized Micro or Nano Particles for Synthesis of New Composite Materials." *U.S. Patent* 8,088,451 (issued January 3, 2012), *PCT Int. Appl.* **2009***, WO 2009114834*.

Journal articles: Peer-reviewed paper published: 12 including the following.

1. **D. Bhattacharyya**, K. K. Gleason. "Synthesis of Low-band Gap Polyselenophene by Oxidative Chemical Vapor Deposition." *J. Mater. Chem.*, **2012**, 22, 405.
2. **D. Bhattacharyya**, K. Senecal, P. Marek, A. Senecal, K. K. Gleason. "High Surface Area Flexible Chemiresistive Biosensor." *Adv. Func. Mater.*, **2011**, 21, 4328. ***(Highlighted as Cover Article)***
3. **D. Bhattacharyya**, W-J Yoon, P. R. Berger, R. B. Timmons. "Plasma Polymerized Multistacked Organic Bipolar Films: A New Approach to Flexible High – κ Dielectrics." *Adv. Mater.,* **2008**, 20, 2383.

Abstracts and Presentations: Conference abstracts, presentations and non-peer reviewed articles: 24+

LEADERSHIP

- Mentored undergraduates and graduates at MIT, Washington University and the UT-Arlington.
- Supervised a high school student in his project which won the gold medal in the *Siemens Competition in Math, Science and Technology* in 2008.