ABHILASH HARPALE

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WORK EXPERIENCE

Intel Corporation *June 2018 - Present*
Data Scientist
Optical proximity correction (OPC) for improving the resolution of photolithography used in the development of advanced microprocessor nodes.

EDUCATION

University of Illinois Urbana-Champaign *Aug 2013 - Feb 2018*
PhD in Aerospace Engineering (Solid Mechanics and Materials)
GPA: 3.81/4.00

Indian Institute of Technology Bombay *Aug 2008 - May 2013*
Dual Degree (B.Tech + M.Tech) in Aerospace Engineering
CPI: 9.43/10.00

TECHNICAL SKILLS

- **Computational Methods**: Molecular Dynamics, Polymer Modeling, FEM, OPC
- **Software Packages**: Matlab, Python, LAMMPS, Abaqus, PTC Creo, C++, Calibre

AWARDS AND HONORS

- UIUC Computational Science and Engineering (CSE) Graduate Fellowship (2014).
- IIT Bombay Silver Medal for ranking first in the Aerospace Engineering Class of 2013 (2013).
- MITACS Globalink Scholarship for internship at University of Calgary (2012).
- IIT Bombay Institute Scholarship for Academic Excellence (2010 and 2011).
- Boeing Scholarship for Excellence in Aerospace Engineering (2009 and 2011).

RESEARCH EXPERIENCE

Ablation of Spacecraft Thermal Protection System (TPS) Using Multiscale Simulations
Guide: Prof. D. Levin, Prof. H. B. Chew, AE, UIUC *(Jan 2016 - Dec 2018)*
Crosslinked phenolic formaldehyde was modeled and characterized in MD. Chemical kinetics derived from MD were used to inform mesoscale and continuum models for direct experimental comparison.

Interfacial Load Transfer Mechanism in CNT-Polymer Nanocomposites
Guide: Prof. H. B. Chew, AE, UIUC *(Jan 2016 - Dec 2016)*
Configurational bias Monte Carlo algorithm was used to model a CNT - PMMA composite. Single fibers pullout results from MD were compared with existing experimental studies.

Patterning of Graphene by Hydrogen Plasma Using Atomic Scale Simulations
Guide: Prof. H. B. Chew, AE, UIUC *(Aug 2014 - Aug 2016)*
Large scale MD simulations were used to study patterning of graphene by low energy hydrogen plasma. Parameters responsible for the different nanopatterns were calculated and compared with experiments.

DFT Simulations for the Solubility of C in Cu and Ni for CVD Growth of Graphene
Guide: Prof. H. B. Chew, AE, UIUC *(Aug 2013 - Aug 2014)*
Used Vienna Ab initio Simulation Package (VASP) to calculate the barrier energy and minimum energy path for the surface to bulk diffusion of isolated and interacting C in FCC Cu and Ni lattices.

JOURNAL PUBLICATIONS

- Sawant S., Rao P., **Harpale A.**, Chew H.B., Levin D., "Multi-scale Thermal Response Modeling of an Avcoat-like Thermal Protection Material" *International Journal of Heat and Mass Transfer* 133 (2019): 1176-1195.
- Bagchi S., **Harpale A.** and Chew H.B., "Interfacial Load Transfer Mechanisms in Carbon Nanotube-Polymer Nanocomposites" *Proceedings of the Royal Society A* 474, 2216 (2018): 20170705.
- **Harpale A.**, Sawant S.S., Kumar R., Deborah L. and Chew H.B."Ablative Thermal Protection Systems: Pyrolysis Modeling by Scale-Bridging Molecular Dynamics" *Carbon* 130 (2018): 315-324
- **Harpale A.** and Chew H.B. "Hydrogen-Plasma Patterning of Multilayer Graphene: Mechanisms and Modeling." *Carbon* 117 (2017): 82-91.
- **Harpale A.**, Panesi M. and Chew H.B. "Plasma-Graphene Interaction and its Effects on Nanoscale Patterning." *Physical Review B* 93 (2016): 035416.
- **Harpale A.**, Panesi M. and Chew H.B. "Communication: Surface-to-Bulk Diffusion of Isolated versus Interacting C Atoms in Ni (111) and Cu (111) Substrates: A First Principle Investigation." *Journal of Chemical Physics* 142 (2015): 061101.

CONFERENCE PRESENTATIONS

- **Harpale A.**, Sawant S.S., Jambunathan R., Deborah L., Chew H.B. "Analysis of Ablative TPS Using Scale-Bridging Molecular Dynamics", *9th Ablation Workshop*, Bozeman, MT, Aug 2017.
- Sawant S.S., **Harpale A.**, Chew H.B., Deborah L. "High fidelity and multi-scale thermal response modeling of an Avcoat-like TPS", *55th AIAA Aerospace Sciences Meeting*, Grapevine, TX, Jan 2017.
- **Harpale A.**, Chew H.B. "Nanoscale Patterning of Graphene by Hydrogen Plasma: A Molecular Dynamics Study", *SES 53rd Annual Technical Meeting* , College Park, MD, Oct 2016.
- **Harpale A.**, Chew H.B. "Plasma-Surface Interaction Simulations: Controlled Patterning of Holes in Graphene", *SES 52rd Annual Technical Meeting* , College Station, TX, Oct 2015.

INVITED TALKS

- **Harpale A.** and Chew H.B."Nanoscale Patterning of Graphene by Hydrogen Plasma: A Molecular Dynamics Study", Department of Aerospace Engineering, *IIT Bombay*, May 2016.

TEACHING EXPERIENCE

- Aerospace Numerical Methods
  Teaching Assistant, Spring 2016
- Finite Element Methods
  Teaching Assistant, Fall 2015
- Applied Aerospace Structures
  Teaching Assistant, Spring 2014