

SASWATA BHATTACHARYA

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Indian Institute of Technology Hyderabad
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EDUCATION

- **Doctor of Philosophy** (Materials Engineering, 2008)
Awarded by Faculty of Engineering, Indian Institute of Science, Bangalore 560012, INDIA.
Thesis: *Evolution of Multivariant Microstructures with Anisotropic Misfit: A Phase Field Study*
- **Master of Science (Engg.)** (Metallurgy, 2002)
Awarded by Faculty of Engineering, Indian Institute of Science, Bangalore 560012, INDIA.
Thesis: *Ternary Spinodal Decomposition: Effect of Interfacial Energy*
- **Bachelor of Technology** (Ceramic Technology, 1999)
Awarded by Government College of Engineering and Ceramic Technology, Calcutta University, Kolkata-700010, West Bengal, INDIA, First class with honors.

PROFESSIONAL EXPERIENCE

- *Materials Scientist* September 2011 - June 2013
Materials Modeling and Tribology Lab
General Electric (GE) India Technology Center
Bangalore - 560066, INDIA
- *Post Doctoral Fellow* July 2008 - July 2011
Research Associate July 2011 - August 2011
Department of Materials Science and Engineering
Penn State University
University Park, PA-16802, USA

RESEARCH INTERESTS

- Phase-field modeling of phase transformations in alloys and oxides
- Integration of mesoscale microstructural evolution models with computational crystal plasticity
- Development of multiscale methods to predict microstructure-property relations
- Discrete dislocation dynamics simulations of deformation in materials
- Development and implementation of integrated computational materials engineering (ICME) tools for materials design

EXPERTISE

- Development of phase field models and their numerical implementation
- Discrete dislocation dynamics simulations of plasticity and creep
- Atomistic modeling using Monte Carlo and Molecular Dynamics simulations
- Programming skills: C, Fortran 90, Python, Matlab, Mathematica, OpenDX, Unix shell programming, awk
- HPC skills: Implementation of OpenMP and MPI parallelization in phase-field codes

LIST OF REFEREED PUBLICATIONS

Journals

1. “Anisotropic Li intercalation in Li_xFePO_4 nano-particle: a spectral smoothed boundary phase-field model”, L Hong, L Liang, *S Bhattacharyya*, W Xing, L -Q Chen, *Physical Chemistry Chemical Physics*, **18**, 9537, 2016
2. “Evolution of Interfacial Dislocation Networks in Particle-Strengthened Alloy Systems During High Temperature Creep: A Discrete Dislocation Dynamics Study”, Tushar Jogi and *Saswata Bhattacharya*, *Transactions of the Indian Institute of Metals*, **69**, 507, 2016
(Won the best student paper award in 7th International Conference on Creep, Fatigue and Creep-Fatigue Interaction, IGCAR, Kalpakkam, INDIA)
3. “An integrated fast fourier transform based phase-field and crystal plasticity approach to model recrystallization of three dimensional polycrystals”, L Chen, J Chen, RA Lebensohn, YZ Ji, T W Heo, *S Bhattacharyya*, K Chang, S Mathaudhu, ZK Liu, L-Q Chen, *Computer Methods in Applied Mechanics and Engineering*, **285**, 829, 2015
4. “Effect of epitaxial strain on phase separation in thin films”, A Lahiri, TA Abinandanan, MP Gururajan, *S Bhattacharyya*, *Philosophical Magazine Letters*, **94**, 702, 2014
5. “Role of polaron hopping in leakage current behavior of a $SrTiO_3$ single crystal”, Y Cao, *S Bhattacharyya*, J Shen, CA Randall, L-Q Chen, *Journal of Applied Physics*, **114**, 224102, 2013
6. “A phase-field model for elastically anisotropic polycrystalline binary solid solutions”, Tae Wook Heo, *Saswata Bhattacharyya* and Long-Qing Chen, *Philosophical Magazine*, **93**, 1468, 2013.
7. “Nonlinear phase-field model for electrode-electrolyte interface evolution”, Linyun Liang, Yue Qi, Fei Xue, *Saswata Bhattacharyya*, Stephen J Harris, and Long-Qing Chen, *Physical Review E*, **86**, 051609, 2012.
8. “Effective elastic properties of polycrystals based on phase-field description”, G. Sheng, *Saswata Bhattacharyya*, H. Zhang, K. Chang, S. L. Shang, S. N. Mathaudhu, Z. K. Liu and L.Q. Chen, *Materials Science and Engineering: A*, **554**, 67, 2012.
9. “Elastic solutions with arbitrary elastic inhomogeneity and anisotropy”, J.J. Wang, *Saswata Bhattacharyya*, Q. Li, T. W. Heo, X. Q. Ma and L. Q. Chen, *Philosophical Magazine Letters*, **92**, 327, 2012.
10. “A Spectral Iterative Method for the Computation of Effective Properties of Elastically Inhomogeneous Polycrystals”, *Saswata Bhattacharyya*, T. W. Heo, K. Chang, and L. Q. Chen, *Communications in Computational Physics*, **11**(3), 726, 2012.
11. “A phase field study of strain energy effects on solute-grain boundary interactions”, T. W. Heo, *Saswata Bhattacharyya* and L. Q. Chen, *Acta Materialia*, **59**(20), 7800, 2011.
12. “A phase-field model of stress effect on grain boundary migration”, *Saswata Bhattacharyya*, T. W. Heo, K. Chang and L. Q. Chen, *Modelling and Simulation in Materials Science and Engineering*, **19**(3), 035002, 2011.
13. “Exploring Topological Defects in Epitaxial $BiFeO_3$ Thin Films”, R. K. Vasudevan, Y. C. Chen, H. H. Tai, N. Balke, P. P. Wu, *Saswata Bhattacharyya*, L. Q. Chen, Y. H. Chu, I. N. Lin, S. V. Kalinin, V. Nagaraajan, *ACS Nano*, **5**(2), 879, 2011.
14. “Watching domains grow: In-situ studies of polarization switching by combined scanning probe and scanning transmission electron microscopy”, H. J. Chang, S. V. Kalinin, S. Yang, P. Yu, *Saswata Bhattacharyya*, P. P. Wu, N. Balke, S. Jesse, L. Q. Chen, R. Ramesh, S. J. Pennycook, A. Y. Borisevich, *Journal of Applied Physics*, **110**(5), 052014, 2011.
15. “A phase-field model for deformation twinning”, Tae Wook Heo, Yi Wang, *Saswata Bhattacharyya*, Xin Sun, Shenyang Hu, Long-Qing Chen, *Philosophical Magazine Letters*, **91**, 110, 2011.
16. “Correlated polarization switching in the proximity of a 180° domain wall”, Vasudeva Rao Aravind, A. N. Morozovska, *Saswata Bhattacharyya*, D. Lee, S. Jesse, I. Grinberg, Y. L. Li, S. Choudhury, P.

- Wu, K. Seal, A. M. Rappe, S. V. Svezhnikov, E. A. Eliseev, S. R. Phillpot, L.Q. Chen, Venkatraman Gopalan and S. V. Kalinin, *Physical Review B*, **82**, 0241111, 2010.
17. “Evolution of multivariant microstructures with anisotropic misfit: A phase field study”, Saswata Bhattacharyya and T. A. Abinandanan, *Acta Materialia*, **57**, 646, 2009.
 18. “Flow kinetics in porous ceramics: Understanding with non-uniform capillary models”, Debdutt Patro, Saswata Bhattacharyya and Vikram Jayaram, *Journal of the American Ceramic Society*, **90**, 3040, 2007.
 19. “Phase separating bulk metallic glass: A hierarchical composite”, Byung Joo Park, Hye Jung Chang, Do Hyang Kim, Won Tae Kim, Kamanio Chattopadhyay, T. A. Abinandanan and Saswata Bhattacharyya, *Physical Review Letters*, **96**, 245503, 2006.
 20. “A study of phase separation in ternary alloys”, Saswata Bhattacharyya and T. A. Abinandanan, *Bulletin of Materials Science*, **26**, 193, 2003.

Conference Proceedings

1. “Phase-field model of diffusional phase transformations in elastically inhomogeneous polycrystals”, Tae Wook Heo, Saswata Bhattacharyya and Long-Qing Chen, *Solid State Phenomena*, **172-174**, 2011, pp. 1084–1089.
2. “A Monte Carlo study of interfacial properties of phase separating alloys”, Saswata Bhattacharyya, Ferdinand Haider and T. A. Abinandanan, *Proceedings of an International Conference on Solid-Solid Phase Transformations in Inorganic Materials 2005*, v 2, 2005, pp. 705–714.

CONFERENCE PRESENTATIONS

1. “Spinodal decomposition in ternary alloys: Effect of interfacial energy”, Saswata Bhattacharyya and T.A. Abinandanan, NMD-ATM of IIM, Kolkata, INDIA, November 15–17, 2003.
2. “A Monte Carlo study of interfacial properties of phase separating alloys”, Saswata Bhattacharyya, Ferdinand Haider and T. A. Abinandanan, International Conference on Solid-Solid Phase Transformations in Inorganic Materials 2005, Phoenix, Arizona, USA, 2005.
3. “Evolution of multivariant microstructures with anisotropic misfit”, Saswata Bhattacharyya and T. A. Abinandanan, Materials Design Workshop: An Indo-US School for Materials Discovery and Design, Bangalore, INDIA, October 29–31, 2007.
4. “An efficient phase-field model for computing stress distributions for polycrystalline microstructures”, Saswata Bhattacharyya, Tae Wook Heo, Kunok Chang and Long-Qing Chen, Materials Science and Technology 2009 Conference and Exhibition, Pittsburgh, PA, USA, 2009.
5. “Phase-field model for precipitation of tetragonal phases in polycrystalline cubic materials”, Saswata Bhattacharyya, Tae Wook Heo and Long-Qing Chen, Materials Science and Technology 2009 Conference and Exhibition, Pittsburgh, PA, USA, 2009.
6. “Effects of inhomogeneous elasticity on solute segregation and phase separation in polycrystals: a phase-field approach”, Tae Wook Heo, Saswata Bhattacharyya and Long-Qing Chen, Materials Science and Technology 2009 Conference and Exhibition, Pittsburgh, PA, USA, 2009.
7. “Phase-field Model of Stress Effect on Grain Growth”, Saswata Bhattacharya, Tae Wook Heo, Kunok Chang, Long-Qing Chen, SIAM Conference on Mathematical Aspects of Materials Science 2010, Philadelphia, PA, USA, 2010.
8. “Phase-field Model of Phase Transformations and Microstructural Evolution in Polycrystals”, Tae Wook Heo, Saswata Bhattacharya and Long-Qing Chen, SIAM Conference on Mathematical Aspects of Materials Science 2010, Philadelphia, PA, USA, 2010.

9. "Determination of Microstructure-Property Correlations Using Phase Field Method", Saswata Bhattacharya, Tae Wook Heo, Kunok Chang, Ricardo Lebensohn, Long-Qing Chen, invited presentation at 2011 TMS Annual Meeting & Exhibition, February 27 - March 3, San Diego, USA, 2011
10. "Phase Field Simulations of Morphological Evolution during Lithium Intercalation in Li-ion Batteries", Saswata Bhattacharya, Linyun Liang and Long-Qing Chen, 2011 TMS Annual Meeting & Exhibition, February 27 - March 3, San Diego, USA, 2011.
11. "Phase-field Modeling of Elastic and Viscoplastic Deformation of Polycrystals", Saswata Bhattacharyya, Tae Wook Heo, Kunok Chang, Ricardo A. Lebensohn, Suveen N. Mathaudhu, Zi-Kui Liu and Long-Qing Chen, 2010 MRS Fall Meeting, Boston, MA, USA, 2010.
12. "Phase-field modeling of ionic/electronic transport in ferroelectrics", Ye Cao, Saswata Bhattacharyya, Clive Randall and Long-Qing Chen, 2010 MRS Fall Meeting, Boston, MA, USA, 2010.
13. "A phase-field model of deformation twinning", Tae Wook Heo, Yi Wang, Saswata Bhattacharyya, Xin Sun, Shenyang Hu and Long-Qing Chen, 2010 MRS Fall Meeting, Boston, MA, USA, 2010.
14. "Phase-Field Simulations of Elastic and Plastic Properties of Polycrystalline Magnesium", Saswata Bhattacharyya, Guang Sheng, Hui Zhang, Kunok Chang, Ricardo Lebensohn, Suveen Mathaudhu, Zi-Kui Liu, Long-Qing Chen, 1st World Congress on Integrated Computational Materials Engineering, Seven Springs, PA, July 10-14, 2011.
15. "Phase-field simulation of columnar and equiaxed growth of dendrites during multiphase solidification of alloys", Lifei Du, Saswata Bhattacharyya, Qigui Wang, Rong Zhang, Long-Qing Chen, 1st World Congress on Integrated Computational Materials Engineering, Seven Springs, PA, July 10-14, 2011.

MEMBERSHIP OF PROFESSIONAL BODIES

- The Minerals, Metals and Materials Society, USA