

Ananya Renuka Balakrishna
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EDUCATION	University of Oxford , Oxford, UK DPhil, Solid Mechanics and Materials Engineering Thesis: Application of a phase field model to ferroelectrics Advisor: John E. Huber	2016
	National Institute of Technology Karnataka , Surathkal, India B. Tech, Mechanical Engineering	2012
PROFESSIONAL APPOINTMENTS	University of Southern California , Los Angeles, CA, USA WiSE Gabilan Assistant Professor, Department of Aerospace and Mechanical Engineering	<i>starting Fall 2020</i>
	University of Minnesota , Minneapolis, MN, USA Postdoctoral Researcher, Department of Aerospace Engineering and Mechanics	2018–2020
	Massachusetts Institute of Technology , Cambridge, MA, USA Lindemann Postdoctoral Fellow, Department of Materials Science and Engineering	2017–2018
AWARDS & HONORS	WiSE Gabilan Assistant Professorship	2019
	Lindemann Postdoctoral Fellowship	2016
	Brasenose Senior Hulme Scholarship	2016
	British Federation of Women Graduates Award	2015
	UK’s top young innovator under the age of 35 (Falling Walls London Lab)	2014
	Felix Graduate Scholarship, University of Oxford	2012
	Honorary Cambridge International & Commonwealth Trust Scholar	2012
	DAAD-WISE Undergraduate Research Fellowship	2011
JOURNAL PUBLICATIONS	[9] Renuka Balakrishna A , Chiang Y-M, and Carter WC. 2019. Phase-field model for diffusion-induced grain boundary migration: An application to battery electrodes. <i>Physical Review Materials</i> , accepted. arXiv:1806.06890	
	[8] Christensen CK, Renuka Balakrishna A , Iversen BB, Chiang Y-M, Ravnsbaek DB. 2019. Order-disorder transition in nano-rutile TiO ₂ anodes: A high capacity low-volume change Li-ion battery material. <i>Nanoscale</i> , accepted. DOI:10.1039/c9nr01228a	
	[7] Bucci G, Talamini B, Renuka Balakrishna A , Chiang Y-M, and Carter WC. 2018. Mechanical instability of electrode-electrolyte interfaces in solid-state batteries. <i>Physical Review Materials</i> , 2(10), 105407. 10.1103/PhysRevMaterials.2.105407.	
	[6] Renuka Balakrishna A and Carter WC. 2018. Combining phase field crystal methods with a Cahn-Hilliard model for binary alloys. <i>Physical Review E</i> , 97(4), 043304. 10.1103/PhysRevE.97.043304	
	[5] Muench I, Renuka Balakrishna A , and Huber JE. 2018. Simulation of periodic, 3D domain patterns in tetragonal ferroelectrics. <i>Archive of Applied Mechanics</i> . 10.1007/s00419-018-1411-9	
	[4] Renuka Balakrishna A , Huber JE, and Muench I. 2016. Nanoscale periodic domain patterns	

in tetragonal ferroelectrics: A phase-field study. *Physical Review B* 93 (17), 174120. 10.1103/PhysRevB.93.174120

[3] **Renuka Balakrishna A** and Huber JE. 2016. Nanoscale domain patterns and a concept for an energy harvester. *Smart Materials and Structures* 25 (10), 104001. 10.1088/0964-1726/25/10/104001

[2] **Renuka Balakrishna A** and Huber JE. 2015. Scale effects and the formation of polarisation vortices in tetragonal ferroelectrics. *Applied Physics Letters* 106 (9), 092906. 10.1063/1.4913917

[1] **Renuka Balakrishna A**, Huber JE, and Landis CM. 2014. Nano-actuator concepts based on ferroelectric switching. *Smart Materials and Structures* 23 (8), 085016. 10.1088/0964-1726/23/8/085016

CONFERENCE
PUBLICATIONS

[2] **Renuka Balakrishna A** and Huber JE. 2014. Design optimisation of ferroelectric nano-actuator using phase field methods. *Proceedings of MRS conference*, San Francisco, USA. 10.1557/opl.2014.545

[1] **Renuka Balakrishna A**, Muench I, and Huber JE. 2015. Study of periodic domain patterns in tetragonal ferroelectrics using phase-field methods. *Proceedings of ASME SMASIS conference*, Colorado Springs, USA. 10.1115/SMASIS2015-8823

INVITED TALKS

[4] “Phase field methods for simulating ferroelectrics and other materials”, Warwick Centre for Predictive Modelling, University of Warwick, 2019

[3] “Microstructural engineering of energy-related materials”, Solid Mechanics and Materials Engineering Seminar, University of Oxford, 2019

[2] “Phase field modeling of microstructural evolution”, Aerospace Engineering and Mechanics Research Seminar, University of Minnesota, MN, 2017

[1] “Phase field crystal modeling of lithium batteries”, Interdisciplinary Centre for Advanced Materials Simulation, Ruhr-University Bochum, Germany, 2017

CONFERENCE
PRESENTATIONS

[17] “Phase field methods for predictive modeling of material microstructures”, Carnegie Mellon Workshop on Mathematical Models for Pattern Formation, Pittsburgh, PA, 2019

[16] “Intercalation induced mechanical failure of olivine compounds”, 2018 MRS Fall Meeting and Exhibit, Boston, MA, 2018

[15] “Combining the crystallographic texture of an electrode with Li-composition field”, Aerospace Engineering and Mechanics Symposium, University of Minnesota, MN, 2018

[14] “Modeling Phase Transition in Battery Electrodes Using the Coupled Cahn-Hilliard – Phase Field Crystal Methods”, 233rd ECS meeting Seattle, WA, 2018

[13] “Phase field crystal modeling of nanoscale electrodes”, American Physical Society (APS) March Meeting, Los Angeles, CA, 2018

[12] “Modeling Phase Transition in Lithium Batteries Using Multi-Scale Continuum Models”, Batteries Gordon Research Conference and Seminar, Ventura, CA, 2018, *Invited Discussion leader*

[11] “Phase Field Crystal Modeling of Coherent Interfaces in Lithium Batteries”, 231st Electrochemical Society meeting, New Orleans, LA, 2017

[10] “Phase Field Crystal Modeling Using Transformation Matrices – an Application to Lithium

Battery Electrodes”, MRS Fall Meetings and Exhibits, Boston, MA, 2017

[9] “Phase-field Modeling of Material Microstructures”, Multiscale Theory and Computation Conference, University of Minnesota, MN, 2017

[8] “Stability of laminate patterns in ferroelectrics” (poster), From Grain Boundaries to Stochastic Homogenization: PIRE Workshop, Leipzig, 2015

[7] “Phase-field modelling of polarization patterns in ferroelectrics”, 9th European Solid Mechanics Conference, Madrid, 2015.

[6] “A conceptual design of a ferroelectric energy harvester”, MRS Spring Meetings and Exhibits, San Francisco, USA, 2015

[5] “A conceptual design of a ferroelectric energy harvester”, ASME SMASIS Spring Meetings and Exhibits, Utah, USA, 2014, *Best Student Paper Award*

[4] “Nano-actuator concepts”, Falling-Walls London-Lab, London, 2015
National Winner – represented UK in the finals held in Berlin, funded by AT Kearney

[3] “Working principle of a nano-actuator based on ferroelectric switching”, the proceedings of EC-COMAS conference on Smart Struct. Mat., Turin, 2013

[2] “Modelling and analysis of resonant beam micro-pressure sensor”, National Conference on MEMS and Smart Materials, Coimbatore, India, 2012, *Best Paper – ISSS Undergraduate Award*

[1] “Sound energy harvesting using macro-fibre composites”, 8th European Solid Mechanics Conference, Graz, Austria, 2012

GRANTS USC WiSE Gabilan Assistant Professorship. Role: PI. Total: \$30,000. 2020–2023

TEACHING **Massachusetts Institute of Technology**
Mentor, Undergraduate research project on spinodal decomposition 2018
Kaufman Teaching Certificate, MIT teaching and learning laboratory 2018

University of Oxford
Tutor, Mechanics of materials course for undergraduates 2015
Teacher, Mathematics as an engineering tool for prospective undergraduates 2014–2015
Lab Instructor, Bridge design and engineering for undergraduates 2014–2015

SERVICE **Reviewer**
Reviewer for over 13 journals, including Physical Review Letters, Physical Review E, Materials, Smart Materials and Structures and European Journal of Mechanics.

Professional memberships
Materials Research Society, Electrochemical Society, American Physical Society

Other
Coordinating a multi-PI project on chemo-mechanics of batteries at MIT
Organized Postdoc seminars in the Department of Materials Science, MIT
Congressional Visit Days, Postdoc representative for MIT Science Policy Initiative 2017