

W. Tyler McCleery

Postdoctoral Scientist, Vanderbilt University

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Education	Vanderbilt University	Postdoctoral Fellow, Physics	2018-present
	John Innes Centre	Postdoctoral Scientist, Systems Biology	2015-2017
	Vanderbilt University	Ph.D., Physics	2012-2016
	<i>Dissertation:</i> Pulling Through: A Biomechanical Analysis of Normal and Aberrant Embryogenesis in <i>Drosophila</i>		<i>Defense:</i> Sept. 2015
	<i>Mentor:</i> Dr. M. Shane Hutson		
	Vanderbilt University	M.A., Physics	2010-2012
	University of Southern Mississippi	B.S., Physics and Mathematics	2006-2010
	<i>Honors Thesis:</i> Analysis of the Motion of a Falling Maple Seed (<i>Acer species</i>)		
	<i>Mentor:</i> Dr. Lawrence Mead		
Career	Visiting Assistant Professor, Physics, University of South Alabama		2017-2018
Publication and Presentation Highlights	<i>Refereed Journal Articles</i>		
	1. W.T. McCleery , J. Veldhuis, G.W. Brodland, M.E. Lacy, M.S. Hutson. "Elongated cells drive morphogenesis in a surface-wrapped finite element model of germband retraction." Under review, <i>Biophysical Journal</i> , 2018.		
	2. S.M. Crews*, W.T. McCleery *, M.S. Hutson "Pathway to a phenocopy: Heat stress effects in early embryogenesis." <i>Developmental Dynamics</i> , 245: 402-413, 2016. (*equal effort and authorship)		
	<i>Refereed Review Articles</i>		
	3. W.T. McCleery *, N.A. Mohd-Radzmann*, V.A. Grieneisen. "Root Branching Plasticity: Collective Decision-Making Results from Local and Global Signalling." <i>Current Opinion in Cell Biology</i> , 44: 51-58, 2017. (*equal effort and authorship; invited for special issue)		
	<i>Invited Presentations</i>		
	4. W.T. McCleery . "Collective Cellular Decision-Making: A Physical Analysis of Development in <i>Drosophila</i> and <i>Arabidopsis</i> ." <i>Department of Biology Colloquium</i> , U. South Alabama. March 2018.		
	5. W.T. McCleery , Pedagogical Lecture and Practical Demonstration, <i>EMBO Practical Course: Multi-level Modelling of Morphogenesis</i> . John Innes Centre, Norwich, UK, July 2017.		
Research Grants	"Development of a Low-Cost Micro-Environment Device for Root-Nutrient Interaction" OpenPlant Fund Principal Applicant: W. Tyler McCleery ; Co-applicants: Ziyi Yu and Zhijun Meng, University of Cambridge, Cambridge, UK; and Veronica A. Grieneisen, John Innes Centre, Norwich, UK Total Costs: £5000 (\$6350); Period of Award: Dec. 2016 – Dec. 2017		
Fellowships & Honors	<ul style="list-style-type: none"> • National Science Foundation Graduate Research Fellowship (\$92,000 + Tuition), 2010-2015 • Harold Stirling Vanderbilt Graduate Scholarship (\$6000), Vanderbilt University, 2010-2015 • <i>summa cum laude</i>, University of Southern Mississippi, 2010 • Society of Physics Student Leadership Scholarship (\$3000), 2009 • Barry Goldwater Scholarship, <i>Honorable Mention</i>, 2008 • Presidential Scholarship (Full Tuition, Room and Board), Univ. of Southern Mississippi, 2006-2010 • Eagle Scout, <i>Silver Palm</i>, Boy Scouts of America, 2005 		
Memberships & Affiliations	Member, American Physical Society (APS-Physics)		2013-Present
	Division of Biological Physics (DBIO)		
	Topical Group on Physics Education Research (GPER)		
	Member, British Society of Developmental Biology		2017-Present

Research Experience	Postdoctoral Scientist, John Innes Centre, Norwich, UK Grieneisen Computational and Systems Biology Lab <ul style="list-style-type: none"> Designing and fabricating <i>in vitro</i> chip platform to modulate root environment <ul style="list-style-type: none"> Experimental Skills: microfluidic xurography and soft lithography Modeling cellular communication via local and global signaling that drives branching decisions in <i>Arabidopsis</i> plant root <ul style="list-style-type: none"> Computational Skills: reaction-diffusion systems of equations; using models to design and interpret wet lab experiments; modeling analysis Initiated collaboration with biologist to interpret experimental data, design follow-up experiments, and hypothesize and predict results 	2015-2017
	Research Assistant, Vanderbilt University Hutson Biomechanical and Biophotonics Lab <ul style="list-style-type: none"> Experimentally and computationally investigated the mechanics of morphogenesis in fruit fly embryos and larvae <ul style="list-style-type: none"> Experimental Skills: live cell imaging; confocal microscopy (scanning, spinning disk, multi-photon); laser ablation/microsurgery; fly husbandry and sample preparation for embryos, larvae, and pupa; heat shock; immunofluorescence staining; soft lithography for microfluidics Computational Skills: programming in Mathematica and Python; cell-level finite element models; cellular Potts models (CompuCell3D) Assisted in construction of Single Plane Imaging Microscope for 3D <i>in vivo</i> imaging <ul style="list-style-type: none"> Experimental Skills: optical system design, selection, and alignment; mechanical system design and fabrication; microscope automation 	2010-2015
	Research Experience for Undergraduates, Cornell University Ralph Lab, Center for Nanoscale Science <ul style="list-style-type: none"> Constructed a diode laser control system that successfully stabilized for ultra-low temperature confocal imaging <ul style="list-style-type: none"> Experimental Skills: soldering; electronic diagrams; analog PID control circuit 	2009
	Undergraduate Thesis and Research, University of Southern Mississippi Mead Theoretical Group & Winstead Optics Lab <ul style="list-style-type: none"> Inferred relationship of seed parameters necessary for auto-rotation during free fall <ul style="list-style-type: none"> Experimental Skills: dimensional analysis; data processing and correlation Assisted in development of an optical detector of radioactivity <ul style="list-style-type: none"> Computational Skills: LabVIEW, Excel; hardware communication 	2007-2010
	Teaching Experience	
	Lecturer, Physics, Vanderbilt University Taught PHYS 1501 and 1502: Introduction to Physics for the Life Sciences	2018-present
	Visiting Assistant Professor, Physics, University of South Alabama Taught PH 201 and 202: Introduction to Physics with Calculus I and II, and PH 114: Introduction to Physics with Alg/Trig I (12 contact hours/semester)	2017-2018
	Blended and Online Learning Design Fellow, Center for Teaching, Vanderbilt Univ. Designed and built a 2 week learning module to enhance lecture in Introduction to Physics for the Life Sciences course, conducting research on teaching electrostatics	2014-2015
	Scientist in the Classroom, Litton Middle School, Nashville, TN Co-taught 6 th and 8 th grade science lab with certified teacher weekly	2013-2014
	Certificate in College Teaching, Center for Teaching, Vanderbilt Univ.	2012
	Teaching Assistant, Department of Physics and Astronomy, Vanderbilt Univ. Taught and assisted curriculum development for a general physics lab for non-science majors, using an interactive, collaborative teaching strategy to engage students and encourage peer-learning	2011-2012

Mentoring Experience	Graduate Students	
	Kazi Tasneem, Chemical Engineering, Research Assistant at Vanderbilt	2018-present
	Undergraduate Students	
	Koray Akozbek, Biology, Research Assistant at USA	2017-present
	Jason Creedon, Physics, Research Experience for Undergraduates at Vanderbilt	2014
	Attiyya Houston, Biomedical Engineering, SyBBURE at Vanderbilt	2013
	High School Students	
	Liam P., Electronics and Programming, Nuffield Research Placement at JIC	2016

Publications and Presentations	<i>Refereed Journal Articles</i>	
	6. Yan, Y., Jiang, L., Aufderheide, K.J., Wright, G., Terekhov, A., Costa, L., Qin, K., McCleery, W.T. , Fellenstein, J.J., Ustione, A., Robertson, B., Johnson, C.H., Piston, D., Hutson, M.S., Wikswo, J.P., Hofmeister, W., Janetopoulos, C. “A Microfluidic-Enabled Mechanical Microcompressor for the Immobilization of Live Single- and Multi-Cellular Specimens.” <i>Microscopy and Microanalysis</i> , 20: 141–151, 2014.	
	<i>Manuscripts in Preparation</i>	
	7. W.T. McCleery , Z. Yu, Z. Meng, V.A. Grieneisen. “Design and Protocol for a Low-Cost Micro-Fluidic Chamber for Live Imaging of Root-Nutrient Interaction.” In preparation, 2018.	
	8. W.T. McCleery , V.A. Grieneisen. “A Parsimonious Model of Local and Global Signalling Uncovers Key to Root Branching Plasticity.” In preparation, 2018.	
	9. N.A. Mohd-Radzmah, W.T. McCleery , V.A. Grieneisen. “Cells Coordinate to Pattern Lateral Root Branching in Dynamic Soil Conditions.” In preparation, 2018.	
	<i>Conference Presentations</i>	
	10. W.T. McCleery , N.A. Mohd-Radzmah, V.A. Grieneisen. “Multi-cellular Modelling of Root Development.” <i>ANTS 2016: Tenth International Conference on Swarm Intelligence</i> , Brussels, Belgium. September 2016.	
	11. W.T. McCleery , J. Veldhuis, G.W. Brodland, S.M. Crews, and M.S. Hutson “Modeling the Epithelial Morphogenesis of Germ Band Retraction in Three Dimensions.” <i>American Physical Society March Meeting</i> , San Antonio, TX, March 2015.	
	12. W.T. McCleery , S.M. Crews, D.N. Mashburn, J. Veldhuis, G.W. Brodland, and M.S. Hutson “3D Forward Modeling of Epithelial Morphogenesis during Germ Band Retraction.” <i>World Congress of Biomechanics</i> , Boston, MA, July 2014.	
	13. W.T. McCleery , S.M. Crews, D.N. Mashburn, J. Veldhuis, G.W. Brodland, and M.S. Hutson “Finite element modeling of heat shock-induced mechanical failure in <i>Drosophila amnioserosa</i> .” <i>Southeastern Section of the American Physical Society Meeting</i> , Bowling Green, KY, November 2013.	
	14. W.T. McCleery , K. Peturis, L. Mead “What goes up must go round: Analysis of a falling maple seed.” <i>Journal of the Mississippi Academy of Sciences</i> , 54:95, January 2009.	
	<i>Conference Posters</i>	
	15. W.T. McCleery , E.C. Rericha, C.J. Brame, M.S. Hutson “BOLD Learning Module: Electrostatics for Introductory Physics for the Life Sciences.” <i>CIRTL Forum</i> , College Station, TX, April 2015.	
	16. W.T. McCleery , S.M. Crews, D.N. Mashburn, J. Veldhuis, G.W. Brodland, and M.S. Hutson “Modeling the Morphogenesis of Epidermal Tissues on the Surface of a 3D Last.” <i>American Physical Society March Meeting</i> , Denver, CO, March 2014.	

Training	➤ “Directed Cell Migration,” Gordon Research Seminar, Galveston, TX	
	➤ ‘Signalling Networks: From Data to Modelling’, Training Workshop, The Genome Analysis Centre, Norwich, UK	
	➤ ‘Multi-level Modelling of Morphogenesis’, EMBO Practical Course, JIC, Norwich, UK	
	➤ ‘Developing Multi-Scale, Multi-Cell Biological Simulations with CompuCell3D and SBW’, Joint Training Workshop, Hamner Institute for Health Sciences, Research Triangle Park, NC	

Science	SwarmOrgan Representative, Fundamentals of Collective Adaptive Systems	2016
Outreach	www.focas.eu/video-sprint	
Leadership	Vanderbilt Student Volunteers for Science	2011-2012
	Chair, Physics Outreach Fair, Society of Physics Students (USM)	2010
	President, Society of Physics Students, USM Chapter	2008-2009

Community	Waterfront Director & Lifeguard, Rap-A-Hope Children's Oncology Summer Camp	2007-2014
Leadership	Merit Badge Counselor, Boy Scouts of America (Troop 28 Winter Camp)	2012-2013
	President, Stage Monkeys Improvisational Comedy Troupe	2008-2009
