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EDUCATION

May 2019	Ph.D. Physics	Texas Tech University
Dec 2013	M.S. Physics	Texas Tech University
May 2012	B.A. Double Major: Mathematics, Physics	Austin College

SPECIALIZATION

Computational Biophysics and Granular Materials

TEACHING EXPERIENCE

2019 – Current	Assistant Professor of Physics	Angelo State University
2019	Instructor	Texas Tech University
2014 – 2019	Graduate Part-Time Instructor	Texas Tech University

CURRICULUM DEVELOPMENT

Assistant Professor **Angelo State University**

2024 – Current Fundamentals of Physics I Lecture and Laboratory
Work with Chair Andy Wallace to implement active-collaborative learning techniques, considered the optimal delivery modality according to physics education research.

2023 Physics B.S. Degree Plan
Work collaboratively with physics faculty to review and recommend changes. New degree plan approved and will be available beginning Fall 2024.

2023 Advanced Physics Laboratory II
Work with Dr. Charles Allen to develop a new course, first delivered in Fall 2023.

2022 – 2023 Advanced Physics Laboratory I (supported by Faculty Learning Commons Mini-Grant)
With support from an ASU FLC Mini-Grant to purchase equipment, work with Dr. Kenneth Carrell to develop a new "sandbox" style high-altitude balloon launch experiment. Activity was successfully deployed during the first delivery of our new course in Spring 2023.

2021 – 2022 Earth and Space Science B.A.
Work with Dr. Heather Lehto to explore the possibility of a new online program. Currently on indefinite hiatus.

2020 General Physics I and II Laboratory
Work collaboratively to develop, revise, and facilitate the transition of existing introductory physics experiments from traditional in-person delivery to completely online delivery.

Graduate Part-Time Instructor **Texas Tech University**

2017 Inquiry-Based General Physics I and II
Update, revise, and expand existing algebra-based physics manuals used in the inquiry-based sections. Work collaboratively with other lecturers and PER faculty to develop training techniques for both graduate and undergraduate teaching assistants.

UNDERGRADUATE RESEARCH MENTORING EXPERIENCE

Yearlong Faculty-Mentored Undergraduate Research Grants **Angelo State University**

2023 – Current Magnetic Detection of Granular Particles Through a Hopper
2022 – 2023 Voronoi Tessellation Optimization
2021 – 2022 Low Signal-to-Noise Image Analysis (PyEDGE)
2021 – 2022 AI Driven Segmentation of Images

One Semester Faculty-Mentored Undergraduate Research Grants **Angelo State University**

2023 FEM Modelling of Railgun Projectiles
2021 Silk Ballooning in *Erigone* Spiders
2020 Intercellular Mechanics of Biofilms

Unfunded Undergraduate Research Projects **Angelo State University**

2023 Parallelization of Voronoi Tessellation
2023 Active Granular Fluid Modeling
2022 – 2023 Flow of Granular Particles Through a Hopper
2022 Cardiogenesis in Zebrafish
2021 – 2023 Ventral Furrow Formation in *Drosophila*
2021 Voronoi Tessellation of Biological Tissues
2020 – 2021 Molecular Dynamics of Alpha Synuclein
2020 Silk Ballooning in *Erigone* Spiders

Unfunded Undergraduate Research Projects **Texas Tech University**

2018 – 2019 Ventral Furrow Formation in *Drosophila*

PROFESSIONAL SERVICE

Assistant Professor **Angelo State University**

2023 – Current Core Curriculum Committee
Serve as member of the University committee tasked with studying the core curriculum and related general education to ensure a coherent rationale, college level, comprise a substantial component of undergraduate degrees, and present a breath of knowledge from specific academic areas. This committee also aligns THECB legislated Texas core curriculum component areas. Recommendations are made to the Provost and Vice President for Academic Affairs for the University's core curriculum and related general education.

2023 – Current International Education Committee
Serve as member of the University committee tasked to plan, recommend, supervise, and evaluate: (1) summer programs in international studies; (2) faculty and student exchange programs with overseas institutions; (3) other international educational experiences for Angelo State University students and faculty, and (4) to advise the Center for International Studies in matters pertaining to international education.

2022 – Current Academic Drop and Withdrawal Committee
Serve as member of the University committee tasked with reviewing and making recommendations to the Provost concerning policies and procedures for course drops and withdrawals, adjudicating student appeals for late course drops and withdrawal from the university, and to make recommendations on process improvement.

2022 – Current Social Media Administrator
Serve as administrator and content creator for departmental social media accounts (Facebook and Instagram; also included TikTok until Texas' ban on all government devices).

2021 – 2023 T&P Teaching Subcommittee
Serve as chair of the departmental subcommittee tasked with developing standards and means of assessment of tenure and promotion (T&P) pillar of teaching. Responsible for scheduling meetings, coordinating between members, and guiding productive discussion during meetings.

2021 – 2022 Recruitment and Retention Committee
Serve as member of the departmental committee tasked with reviewing and enhancing the department's recruitment and retention activities.

2021 – 2022 ADA Committee
Serve as a member of the University committee tasked with studying and making recommendations regarding the University's services, policies, and practices in order to provide accessibility of facilities and services to disabled persons.

2021 FREP Grant Committee
Serve as a member of the University committee tasked with reviewing and evaluating yearly Faculty Research Enhancement Program (FREP) grant applications. FREP exists to support innovative research and provide seed monies to attract non-state financial support for research and creative endeavors.

2020 – Current Instructional Technology Committee Member
Serve as member of the College committee tasked with establishing standards for online or hybrid course creation and review, evaluating viability of new technologies for classroom implementation, and recommending areas for instructional technology training.

2020 – Current Women in Physics (WiP) Advisor
Serve as the faculty advisor for WiP by providing guidance and support to members and officers. Assisted in establishing the first WiP group at ASU which also has the distinction of being the third independent registered student organization of its kind in the State of Texas.

2019 – Current Society of Physics Students (SPS) Advisor
Serve as the faculty advisor for SPS by providing guidance and support to members and officers.

2019 HHMI IE3 Leadership Grant Committee Member
Served as a member of the College committee tasked with creating a proposal for the Howard Hughes Medical Institute (HHMI) Inclusive Excellence (IE) grant to support meaningful change in diversity and inclusion.

Graduate Part-Time Instructor **Texas Tech University**

2017 RaiderReady Mentor
Serve as a faculty mentor for first-generation and high-risk first-semester students.

2016 – 2019 Sigma Pi Sigma Chapter President
Coordinate volunteer efforts for outreach events, such as the South Plains Regional Science and Engineering Fair. Work with departmental advisors to review undergraduate and graduate students for induction eligibility. Plan and coordinate annual induction ceremony. Developed, planned, and supervised TTU Department of Physics and Astronomy's First and Second Annual Student Poster Competition.

2016 Grade Appeal Committee Member
Serve as a member of the College committee tasked to review, investigate, and suggest response to student-initiated grade appeals filed with the Dean of the College of Arts and Sciences.

2014 – 2018 Discussion Coordinator and TA Trainer
Meet with graduate teaching assistants (TAs) and undergraduate assistants (UGAs) once a week to prepare them for the upcoming week. Develop mini-lectures, assignments, and exercises to be implemented by graduate TAs for discussion sections that cover material relevant across multiple lecture sections. Work with UGAs to reinforce content knowledge and develop sound pedagogical practices.

NOTABLE VOLUNTEER SERVICE

2022 – Current Summer and Winter Physics Road Shows
2022 Student Research Project Mentor
2020 TRIYS Research Project Mentor
2019 – Current SPS and WiP Outreach Events

PUBLICATIONS

R.A. Niloy, **M.C. Holcomb**, J.H. Thomas, and J. Blawzdziewicz. (in press). The mechanics of cephalic furrow formation in the *Drosophila* embryo. *Biophys. J.*, 122(19), P3843-3859, 2023

G.-J.J. Gao, **M.C. Holcomb**, J.H. Thomas, and J. Blawzdziewicz. A Markov chain Monte Carlo model of mechanical-feedback-driven progressive apical constrictions captures the fluctuating collective cell dynamics in the *Drosophila* embryo. *Front. Phys.*, 28, 2022

M.C. Holcomb, G.-J.J. Gao, M. Servati, D. Schneider, P.K. McNeely, J.H. Thomas, and J. Blawzdziewicz. Mechanical Feedback and Robustness of Apical Constrictions in Drosophila Embryo Ventral Furrow Formation. *PLoS Comput. Biol.*, 17(7): e1009173, 2021

G.-J.J. Gao, F.-L. Yang, **M.C. Holcomb**, J. Blawzdziewicz. Enhanced flow rate by the convergence of Tetris particles when discharged from a hopper with an obstacle. *Phys. Rev. E*, 103(6), 2021

M.C. Holcomb. Coordination of Ventral Furrow Formation During Drosophila Gastrulation Through Mechanical Stress Feedback. Ph.D., Texas Tech University, 2019

G.-J.J. Gao, J. Blawzdziewicz, **M.C. Holcomb**, and S. Ogata. Understanding the Local Flow Rate Peak of a Hopper Discharging Discs through an Obstacle Using a Tetris-like Model. *Granular Matter,* 21(25), 2019

G.-J.J. Gao, **M.C. Holcomb**, J.H. Thomas, and J. Blawzdziewicz. Embryo as an active granular fluid: stress-coordinated cellular constriction chains. *J. Phys. Condens. Matter*, 28(41), 2016

INVITED PRESENTATIONS

"Mechanical feedback during ventral furrow formation in *Drosophila*: exploring intercellular coordination and robustness." Angelo State University Biology Department Bio-Lunch, San Angelo, TX, January 24, 2020

"Exploring cellular harmonization via mechanical feedback mechanisms." Angelo State University Society of Physics Students Seminar, San Angelo, TX, October 21, 2019

"Cellular harmonization during embryonic development: how do cells coordinate mechanical activity?" Trinity University Physics Department Seminar, San Antonio, TX, November 28, 2017

CONFERENCE PRESENTATIONS

M.C. Holcomb, N.A. Redowan, J.H. Thomas, and J. Blawzdziewicz. The mechanics of cephalic furrow formation in the *Drosophila* embryo. Abstract no. H04.00003. Joint Fall 2023 Meeting of the Texas Section of the APS, Texas Section of the AAPT, and Zone 13 of the Society of Physics Students, San Angelo, Texas, October 12-14, 2023

M.C. Holcomb, G.-J.J. Gao, J.H. Thomas, and J. Blawzdziewicz. Capturing the dynamics of mechanical-feedback driven apical constrictions in the *Drosophila* embryo using a Markov chain Monte Carlo Model. Abstract #250. Texas Academy of Science Annual Meeting, San Angelo, Texas, March 3-4, 2023

W. Hennig and **M.C. Holcomb**. Optimizing of Voronoi diagram algorithms through parallelization. Abstract #173. Texas Academy of Science Annual Meeting, San Angelo, Texas, March 3-4, 2023

N. Marichalar, E.Y. Ji, and **M.C. Holcomb**. Optimizing the flow of granular particles through a 3D hopper. Abstract #226. Texas Academy of Science Annual Meeting, San Angelo, Texas, March 3-4, 2023

R.A. Niloy, **M.C. Holcomb**, J.H. Thomas, and J. Blawzdziewicz. The cellular mechanics of cephalic furrow formation in the *Drosophila* embryo investigated using an advanced vertex model. Abstract no. W08.00007. APS March Meeting 2023, Las Vegas, Nevada, March 5-10, 2023

M.C. Holcomb, G.-J.J. Gao, F-L. Yang, and J. Blawzdziewicz. Mechanisms for Enhanced Hopper Flow Rate from a Hopper with an Obstacle. Joint Spring 2022 Meeting of the Texas Section of the APS, Texas Section of the AAPT, and Zone 13 of the Society of Physics Students, Abilene, Texas, March 10-12, 2022

T. Long and **M.C. Holcomb**. Tracking Cells of a Developing Embryo with PyEDGE. Joint Spring 2022 Meeting of the Texas Section of the APS, Texas Section of the AAPT, and Zone 13 of the Society of Physics Students, Abilene, Texas, March 10-12, 2022

T. Long and **M.C. Holcomb**. Watershed Image Analysis Using OpenCV's Python Package. Joint Spring 2022 Meeting of the Texas Section of the APS, Texas Section of the AAPT, and Zone 13 of the Society of Physics Students, Abilene, Texas, March 10-12, 2022

G.-J.J. Gao, F.-L. Yang, **M.C. Holcomb**, and J. Blawzdziewicz. The mechanism for hopper flow rate enhancement by an optimally-placed obstacle. 15th World Congress on Computational Mechanics & 8th Asian Pacific Congress on Computational Mechanics, Yokohama, Japan, 31 July - 5 August, 2022

M.C. Holcomb, G.-J.J. Gao, M. Servati, D. Schneider, P.K. McNeely, J.H. Thomas, and J. Blawzdziewicz. Cellular Constriction Chains in the *Drosophila* Embryo: Mechanical Feedback and Robustness of Morphogenetic Movements. Abstract no. F01.00006. Joint Fall 2019 Meeting of the Texas Section of the APS, Texas Section of the AAPT, and Zone 13 of the Society of Physics Students, Lubbock, Texas, October 25-26, 2019

M.C. Holcomb, G.-J.J. Gao, M. Servati, J.H. Thomas, and J. Blawzdziewicz. Mechanical Feedback during Ventral Furrow Formation in *Drosophila*: Intercellular Coordination and Robustness. Abstract no. E50.00012. APS March Meeting 2018, Los Angeles, California, March 5-9, 2018

M. Servati, **M.C. Holcomb**, G.-J.J. Gao, J. Blawzdziewicz, and J.H. Thomas. Exploring Cellular Constriction Chain Dynamics in *Drosophila* Embryo. Abstract no. L60.00245. APS March Meeting 2018, Los Angeles, California, March 5-9, 2018

M.C. Holcomb, G.-J.J. Gao, J.H. Thomas, and J. Blawzdziewicz. Mechanical Feedback in the *Drosophila melanogaster* Embryo: Robustness and Intercellular Coordination. Abstract no. K4.00004. Joint Fall 2017 Meeting of the Texas Section of the APS, Texas Section of the AAPT, and Zone 13 of the Society of Physics Students, Richardson, Texas, October 20-21, 2017

M.C. Holcomb, G.-J.J. Gao, J.H. Thomas, and J. Blawzdziewicz. Embryo as an active granular fluid: stress-coordinated cellular constriction chains. Abstract no. D30.00002. 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, Oregon, November 20-22, 2016

M.C. Holcomb, G.-J.J. Gao, J.H. Thomas, and J. Blawzdziewicz. *Drosophila melanogaster* Embryo as an Active Granular Fluid: Intercellular Coordination via Mechanical Feedback during Morphogenesis. Abstract no. 230ao. AIChE Annual Meeting, San Francisco, California, November 13-18, 2016

OTHER ACADEMIC ACHIEVEMENTS, HONORS, AWARDS, AND ACTIVITES

2023 CRASH – Culturally Responsive Approaches to Serving Hispanic Students; Angelo State University
2022 Nominated for President's Award in Faculty Excellence for Leadership/Service; Angelo State University
2019 Session Chair for Biological and Soft Matter Physics; APS 2019 Joint Fall Meeting
2018 Doctoral Dissertation Completion Fellowship; Texas Tech University (TTU) Graduate School
2016 American Physical Society Division of Fluid Dynamics Travel Grant
2013 TEACH Program Fellow; TTU Teaching, Learning, and Professional Development Center
2012 Sigma Pi Sigma; Physics National Honor Society

ADDITIONAL SKILLS & EXPERIENCE

Academic & Teaching

Academic event planning
Hybrid split-model, online, and face-to-face instruction modalities
Inquiry, studio, and workshop instruction modalities
Instructor of record for 13-200 seat sections
Lab Instructor for 6-60 seat sections
One-on-one and small group tutoring
Proposal writing for federal (NSF, NIH) and private (KECK Foundation) funding sources

Research advising for STEM and non-STEM undergraduates
Undergraduate and graduate student mentoring

Programming & Computers

Bash shell scripts
Fortran90 based computer programming
Gnuplot scripts
Image editing and figure generation software: Affinity Designer, GIMP, Inkscape, and Fresh Paint
Java based computer programming
Learning management system: Blackboard and TopHat
Learning support software: Gradescope and TopHat
NI LabVIEW programming
Office productivity software: Microsoft Office, OpenOffice
Operating systems: Microsoft Windows, Scientific Linux, Debian, Ubuntu
Video recording and editing software: Camtasia, Kaltura, Knowmia, and OpenShot
Video streaming software: Collaborate Ultra, WebEx, and Zoom

Equipment

National Instruments interface and related data acquisition equipment
Pasco introductory physics lab equipment
Power, air, and hand tool proficiency
Thor Labs optical tables, lenses, filters, sources, and related interfacing equipment
Vernier LabPro and LabQuest interfaces, Logger Pro, and related data acquisition equipment

Medical

Medical terminology proficiency
Medical Response Emergency System (MRES) Computer Aided Dispatch (CAD)
Previous completion of GEMS, PEPP, and AHA healthcare provider (CPR and AED) education
Previous completion of EMT-Basic education including Weapons of Mass Destruction response safety
Sterile technique and body substance isolation precautions