

Matthew Clay Fleenor

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POSITION: Professor of Physics & Astronomy
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University of North Carolina, Chapel Hill

AUG 2001 - AUG 2006
Doctorate (PhD) Physics & Astronomy

University of Massachusetts, Boston

SEP 1999 - AUG 2001
Master of Science (MS) Applied Physics

University of Tennessee, Knoxville

SEP 1995 - MAY 1998
Master of Science (MS) Secondary Science Education

AUG 1989 - MAY 1994
Bachelor of Science (BS) Materials Science & Engineering

ACADEMIC EXPERIENCE

UNDERGRADUATE

Professor of Physics & Astronomy (2022–), *Univ. of Mary Washington (VA)*
Physics Program Coordinator (2022–), *Univ. of Mary Washington (VA)*
Professor of Physics & Astronomy (2019–2022), *Roanoke College (VA)*
Adjunct Instructor, Hiking & Backpacking (2013–2022), *Roanoke College (VA)*
Physics Group & Dual-degree Coordinators (2014–2020), *Roanoke College (VA)*
Associate Professor of Physics & Astronomy (2012–2018), *Roanoke College (VA)*
Assistant Professor of Physics & Astronomy (2006–2012), *Roanoke College (VA)*
Astronomy Lab Coordinator (2004), *University of North Carolina, Chapel Hill (UNC)*
Planetarium Instructor (2002–2004), *UNC*
Physics & Astronomy Teaching Assistant (2001–2002), *UNC*
Physics Teaching Assistant (1999–2001), *University of Massachusetts, Boston*

SECONDARY

Calculus, Geometry Instructor (1999), *New England Hebrew Academy (MA)*
Physics, Chemistry I & II Instructor (1996–1999), *Christian Academy of Knoxville (TN)*
Physics & Chemistry I Instructor (1995), *Bearden High School (TN)*

AWARDS & HONORS

2022–, Facilitator, APS Department Action Leadership Institute
2022, Finalist, AAAS Science & Technology Policy Fellow
2019–2022, STEM Faculty Fellow, Lilly Fellows Program
2019, Advisor, Outstanding Chapter Award, Society of Physics Students
2015–2018, Faculty Scholar, Roanoke College
2018, Advisor, Blake Lilly Prize for Outreach, Society of Physics Students
2016–2018, Advisor, Distinguished Chapter Award, Society of Physics Students
2017, Eclipse Ambassador, Great Smoky Mountains National Park
2015–2017, 2012, Excellence in Teaching Award, Roanoke College, Nominee
2016, Finisher– “2,000 miler”, Appalachian Trail
2013–2015, DOE Visiting Faculty Researcher, Oak Ridge National Laboratory
2011, Fulbright Scholar Award, Candidate in Astrophysics

VOCATIONAL ASPIRATION

I aspire to further both a professional and public understanding of the sciences as an on-going human enterprise. Under this umbrella, the following professional research areas are included: STEM education, observational astrophysics, and nuclear materials detection. Activities promoting scientific literacy in the public are also essential to my vocation, as well as an integration of science with other ways of knowing.

From this statement, three creative streams emerge from which I express my vocation: science education research, scientific literacy promotion, and professional imaging research.

PROFESSIONAL FRUITFULNESS

SCIENCE EDUCATION RESEARCH & PROMOTION

– Accepted Peer-reviewed Publications:

Fleenor, M.C. (2021) “Grounded Mentoring as a Pathway for Program-building”, *Chronicle of Mentoring and Coaching*, **4**, no. 14, 421–428.

Fleenor, M.C. (2019) “Role-playing Simulation as an Avenue for History of Science Awareness”, *Sixteenth Century Journal*, **50** no. 4, 1149–1154.

Fleenor, M.C. (2018) “Cultivating Experimental Innovation Within Undergraduate Physics Majors”, *Global Education Review*, **5** no. 1, 73–87.

Poli, D., Fleenor, M.C., & Rearick, M. (2012), “Drawing on Popular Culture: Using Tattooing to Introduce Biological Concepts”, *American Biology Teacher*, **74** no. 6, 381-385.

Fleenor, M.C., Poli, D., & Rearick, M. (2010), “Having your cake and eating too: student engagement and collaborative faculty development”, *Proceedings of the Lilly Conference on College and University Teaching* held at Univ. of North Carolina Greensboro, 5–7 Feb. 2010, Ed. R. Purdom.

– Submitted Peer-reviewed Publications:

Bala, R., Findley-van Nostrand, D., & Fleenor, M.C. (2022) “Innovative Programmatic Elements that accord with Women Retention in STEM”, *Frontiers in Education*, section *STEM*, submitted. Available at <https://arxiv.org/abs/2111.13776>

– Conferences & Workshops in Science Education:

“Earth Patterns, Cycles, and Change” (2011–12), Invited Instructor for Earth & Space Science Standards of Learning, Grades 3–5 (regional), Hollins Elementary Science Institute for Teachers, 16–28 JUN, Hollins University (VA).

“Integrative Learning through Collaborative Teaching Grants” (2010), Invited Oral with S. Kirby and D. Sarabia, Teagle Conference for Integrative Learning, 1 – 2 OCT, Moravian College (PA).

“Engaging the Unengaged: Bio-contextualized Physics Lab” (2010), Invited Oral with D.B. Poli and M. Rearick, Institutionalizing Integrative Learning: Faculty Development, Course Development & Assessment, 16–20 JUN, Roanoke College (VA).

“Having Your Cake and Eating Too: Student Engagement and Collaborative Faculty Development” (2010), Contributed Oral with M. Rearick and D.B. Poli (~30% acceptance), Lilly National Conference on College and University Teaching, 4–6 FEB, Greensboro (NC).

– Accepted External, Refereed Proposals:

2019, “Lilly STEM Initiative for Mid-Career Faculty”, Lilly Faculty Fellows Program– co-PI, with M. P. Rearick, \$25K.

2018, “Micro-Raman Spectrometer for Materials Science Research”, Claude Moore Charitable Foundation– co-PI, with R. Balasubramanian & J. Bradley, \$25K.

– Collaborative Contributions on Accepted External Proposals:

2021, “Astrophotography of the Multi-Wavelength Universe!: Pulsar Group”, Curriculum Developer and Instructor, DOD, Dan Reichart (PI), \$3M

2021–2019, “Understanding Drivers and Measuring Outcomes of STEM Attitude Gains with Skynet-based Observing Experiences for Introductory Astronomy Students”, Instructor, NSF-IUSE, Dan Reichart (PI), \$1M

– Referee, Peer-Reviewed Journal:

American Journal of Physics, *Science Education*, *Global Education Review*, *The Physics Teacher*, *Chronicle of Mentoring & Coaching*

ASTRONOMICAL AND RADIATION IMAGING

– Completed Manuscript:

Fleenor, M. C. (2006), *Morphology and Large-Scale Structure within the Horologium-Reticulum Supercluster of Galaxies*, Dissertation under the direction of James A. Rose, Chapel Hill, NC.

– Accepted Refereed Publications:

Fleenor, M. C., Blackston, M. A., & Ziock, K.–P. (2015), “Statistical Correlated Uncertainties in Coded-Aperture Imaging”, *Nuclear Instruments and Methods in Physics Research Section A*, **784**, 370–376.

Fleenor, M. C. & Johnston–Hollitt, M. (2010), “Megaparsec–Scale Triggers for Star Formation: Clusters and Filaments of Galaxies in the Horologium-Reticulum Supercluster”, in Smith, B. et al., ed., *Proceedings of Galaxy Wars: Stellar Populations and Star Formation in Interacting Galaxies*. Astro. Soc. Pacific, San Francisco, 81–86.

Johnston–Hollitt, M., Sato, M., Gill, J. A., Fleenor, M. C., & Brick, A.–M. (2008), “Radio Observations of the Horologium-Reticulum Supercluster– I. A3158: Excess star-forming galaxies in a merging cluster?”, *Monthly Notices of the Royal Astronomical Society*, **390**, 289–303.

Miller, J., Quammen, C., & Fleenor, M. C. (2006), “Interactive Visualization of Intercluster Galaxy Structures in the Horologium-Reticulum Supercluster”, *IEEE Transactions on Visualization and Computer Graphics Journal*, 12, 1149–1155.

Fleenor, M. C., Rose, J. A., Christiansen, W. A., Johnston-Hollitt, M., Hunstead, R. W., Drinkwater, M. J., & Saunders, W. (2006), “Redshifts and Velocity Dispersions of Galaxy Clusters in the Horologium-Reticulum Supercluster”, *Astronomical Journal (AJ)*, 131, 1280–1287.

Fleenor, M. C., Rose, J. A., Christiansen, W. A., Hunstead, R. W., Johnston-Hollitt, M., Drinkwater, M. J., & Saunders, W. (2005) “Large-Scale Velocity Structures in the Horologium-Reticulum Supercluster”, *AJ*, 130, 545–563.

– Presentations:

“Bootstrapped Uncertainties in Coded-Aperture Images” (2016), Contributed Poster (~ 50% acceptance), IEEE Nuclear Science Symposium/Medical Imaging Conference (NSS/MIC), 31 OCT, Strasbourg, France

“Statistical Correlated Uncertainties in Coded-Aperture Imaging” (2014), Contributed Oral (~ 60% acceptance), Symposium of Radiation Measurements and Analysis (SORMA) XV, Univ. of Michigan, 11 JUN, Ann Arbor, MI

“How Multi-Wavelength Datasets Aid in Galaxy Evolution Studies” (2012), Invited Oral, University of Virginia, Astronomy Colloquium, 10 APR, Charlottesville, VA

“Advantages at Multi-Wavelengths: A Pre-Processed Galaxy Group within a Cluster” (2011), Contributed Oral (~ 70% acceptance), *Structure in Clusters and Groups of Galaxies in the Chandra Era*, 14 JUL, Boston, MA

“Megaparsec-Scale Triggers for Star Formation: Clusters and Filaments of Galaxies in the Horologium-Reticulum Supercluster” (2009), Contributed Oral (~ 30% acceptance), *Galaxy Wars: Stellar Populations and Star Formation in Interacting Galaxies*, 21 JUL, Johnson City, TN

– Accepted External, Refereed Proposals:

2015, “Assessing Coded-aperture Imager Capabilities through Bootstrap Sampling”, Department of Energy Visiting Faculty Program (DOE VFP)– Oak Ridge National Laboratory (TN), \$15K.

2014, “Development of Detection Algorithms for Coded-Aperture Imaging”, DOE VFP– Oak Ridge National Laboratory (TN), \$25K.

2013, “Toward a Statistical Analysis of Coded-Aperture Imager Data”, DOE VFP– Oak Ridge National Laboratory (TN), \$15K.

2011, “Operating on Multiwavelengths: Observational and Pedagogical Astrophysics”, Fulbright Scholar Program– New Zealand, accepted at the disciplinary review stage.

– Referee, Peer-Reviewed Journal:

Monthly Notices of the Royal Astronomical Society, Nuclear Instruments and Methods in Physics

SCIENTIFIC LITERACY FOR THE PUBLIC

– Completed Manuscript:

Fleenor, M. C. (2020), *Blue Star, New Star*; children’s emerging reader, Archway Publishers.

– Accepted Refereed Publication:

Fleenor, M. C. (2018), “‘Faith Seeking Understanding’ As An Intellectual Approach to 21st c. Cosmology”, *Perspectives on Science and Christian Faith*, **71** no. 3, 153–159.

– Presentations:

“Creation as the Wound of God” (2019), Contributed Paper (~ 75% acceptance), Ian Ramsey Centre Summer Conference, 20 JUL, Oxford, UK

–Invited Lectures in Astronomy

2018–2007, Astronomy Elderhostel, Workshop Organizer– “Galaxies as Observational Building Blocks”, Mountain Lake, VA; 3 hour interactive discussion on the nature of the universe.

2017, 2011, 2009, Roanoke College Elderscholar, ~ 60 older adults; less-technical

2017, “What is a Solar Eclipse Ambassador?”

2011, “Counting Planets: What Makes Extrasolar Planets Count”

2009, “How Astronomers Move from Observation to Interpretation”

2013, “Multi-wavelength Astrophysics: How Non-optical Light Informs Our Understanding of the Universe,” TriStar Astronomy Conference, 2 MAR, Greensboro, NC; more technical

RECENT PROFESSIONAL DEVELOPMENT ACTIVITIES

SEP 2022, Department Action Leadership Institute Kick-off Workshop, APS, DC

AUG 2022, SafeZone Ally Training, Univ. of Mary Washington

MAY 2021, “If You Lead, Will They Follow?,” American Inst. Physics (Webinar)

FEB 2021, “Understanding Dynamic Ecosystems,” AAAS Annual Meeting (Virtual)

AUG 2020, “Foundations of Social Justice for Engineers,” Am. Soc. Engineering Education

JUN 2020, “Addressing Anti-Blackness on Campus: Implications,” CORA Seminar

APR 2020, “Converting your Electronics Laboratory Online,” Cambridge Univ. Press

APR 2019–2020, Lilly Fellows STEM/Professional Programs # 1–3

APR 2019, “Alternate Forms of Teaching Evaluation,” Roanoke C. Teaching Collaborative

DEC 2018, “Implementing Grit Strategies for Students,” Roanoke C. Teaching Collaborative

SEP 2018, “Showing Empathy in the Classroom,” Roanoke C. Teaching Collaborative

AUG 2018, “Discussion of Duckworth’s *Grit*,” Roanoke C. Teaching Collaborative

APR 2018, “Teaching the Whole Physics Student,” Am. Physical Soc.

JUL 2017, “Communicating Science: Fundamentals for Public Engagement,” AAAS

JUN 2017, “How to Communicate with Congress,” AAAS

MAR 2017, “Defining Whiteness,” Roanoke College Diversity Dine-in