

University Senate Chair Award Nominee Information

Dr. Gergana G. Nestorova
Associate Professor and MSNT Program Chair
School of Biological Sciences
College of Applied and Natural Sciences

1. List of Courses Taught and Overall Teacher Evaluation

Year	Fall		Winter		Spring	
	Course	Rating	Course	Rating	Course	Rating
2023	BISC418: Molecular Biotechnology	4.0	BISC 406: Introd. to Endocrinology	3.8		
	BMSNT657: Graduate Biotechnology	4.0	BISC 506: Graduate Endocrinology	4.0		
	MSE512: Biotechnology Principles	4.0				
2022	BISC418: Molecular Biotechnology	4.0	BISC406: Introduction to Endocrinology	3.7	BISC492: Protein Analysis	4.0
	BISC518: Graduate Biotechnology	4.0	MSNT510: Graduate Endocrinology	4.0	BISC592: Grad. Protein Analysis	4.0
	MSNT657: Graduate Biotechnology	4.0				
	MSE512: Biotechnology Principles	4.0				
2021	BISC418: Molecular Biotechnology	4.0	BISC406: Introd. to Endocrinology	3.7	BISC492: Protein Analysis	3.8
	BISC518: Graduate Biotechnology	4.0	MSNT510: Graduate Endocrinology	4.0	BISC592: Grad. Protein Analysis	4.0
	MSNT657: Graduate Biotechnology	4.0	BISC480: Undergraduate Seminar*	N/A		
	MSE 512: Biotechnology Principles	4.0				
2020	BISC 418: Molecular Biotechnology	3.5	BISC 406: Introd. to Endocrinology	3.9	BISC492: Protein Analysis	4.0
	BISC 518: Graduate Biotechnology	4.0	BISC 506: Graduate Endocrinology	4.0	BISC592: Grad. Protein Analysis	4.0
	MSNT657: Graduate Biotechnology	4.0	BISC 506: Graduate Endocrinology	4.0	BISC535: Topics in BioSciences*	N/A
	MSNT611: Dissertation Seminar	4.0				
2019	BISC450C: Biotechnology Principles	4.0	BISC492: Protein Analysis	3.7	BISC406: Introd. to Endocrinology	4.0
	MSE512: Biotechnology Principles	4.0	BISC592: Graduate Protein Analysis	4.0	BISC506: Graduate Endocrinology	4.0
	MSNT510: Graduate Biotechnology	4.0	MSNT657: Graduate Protein Analysis	4.0		
	MSNT657: Graduate Biotechnology	4.0	BISC480: Undergraduate Seminar*	N/A		
2018	BISC450C: Biotechnology Principles	4.0	BISC492: Protein Analysis	4.0	BISC406: Introd. to Endocrinology	3.4
	MSE512: Biotechnology Principles	4.0	BISC592: Graduate Protein Analysis	4.0	BISC506: Graduate Endocrinology	3.5
	MSNT510: Graduate Biotechnology	4.0	MSNT657: Graduate Protein Analysis	4.0	MSNT510: Graduate Endocrinology	4.0
	MSNT657: Graduate Biotechnology	4.0			BISC535: Topics in BioSciences*	N/A
2017	BISC492: Protein Analysis	4.0	BISC450C: Biotechnology Principles	4.0	BISC406: Introd. to Endocrinology	3.8
	BISC592: Graduate Protein Analysis	4.0	BISC 516C: Graduate Biotechnology	4.0	MSNT510: Graduate Endocrinology	3.5
	MSNT611: Dissertation Seminar	4.0	MSNT510: Graduate Biotechnology	4.0	MSNT657: Graduate Endocrinology	4.0
			MSE 512: Biotechnology Principles	4.0		
Course rating average				3.93		

* Courses not submitted for evaluation

2. Statement of Beliefs Concerning the Importance of Teaching, Research, and Community/ University Service to the Overall Mission of the University

As an educator at my alma mater, Louisiana Tech University, I firmly believe in upholding the university's mission of teaching, research, and service to the community. In my view, these three components are vital for cultivating a thriving academic environment that can make a meaningful difference both within the university and beyond. I am committed to working towards this goal and believe that by prioritizing these areas, we can create a more engaged and impactful academic community that positively impacts society as a whole.

Teaching is the cornerstone of Louisiana Tech University's mission, and it is a vital part of my role as an educator. During my tenure at Louisiana Tech University, I have had the privilege of teaching undergraduate and graduate interdisciplinary courses which require a fine balance between the level of material presented and an appropriate examination of students' performance. I have incorporated various teaching methods such as in-class discussions, student presentations, and medical animations to promote student engagement and improve communication and writing skills. I am committed to the ongoing professional development of my students and continually strive to improve my pedagogy through engagement with the latest research and educational best practices. I use a variety of delivery methods, such as lectures, lab experiments, group discussions, student presentations, and critical analysis of peer-reviewed articles in the field, to effectively convey scientific

knowledge. As the Program Chair for the MSNT program, I developed a new graduate seminar course, which includes presentations on topics that enhance both the professional development of graduate students and introduce them to emerging topics in the field of molecular sciences and nanotechnology. I am also involved in developing and submitting federal and state-level educational instrumentation grants aimed at improving the University lab infrastructure. By procuring advanced equipment and resources, I strongly believe that we were able to better prepare our students for their future careers in the sciences.

As an educator and scholar, I believe that research is an essential aspect of Louisiana Tech University's mission, and it is a fundamental part of my role. My goal is to contribute to the body of knowledge in my field by conducting original research and scholarship that is not only vital for advancing knowledge but also inspires and engages students. As an educator, I aim to incorporate my research into my teaching whenever possible. At Louisiana Tech University, I established the Applied Genomics and Biotechnology Laboratory, where both graduate and undergraduate students engage in research that focuses on genomic and proteomics analysis of biomarkers and biosensors development. These research efforts have led to the creation of a tool for rapid genetic analysis on the International Space Station (ISS), which attracted extensive professional and general media interest. Astronaut Dr. Kathleen Rubins validated the technology in February 2021, making it the first experiment from the Louisiana Tech University faculty on ISS. Our research has been featured in various media outlets, including KNOE News, Evesflow microfluidics (France-based company and leader in microfluidics technology), Beyond 1894 La Tech Podcast, Ruston Daily Leader, and The News-Star newspaper.

I am passionate about providing mentorship to both graduate and undergraduate students. Since 2016, I have served as a research advisor to five Ph.D., four M.S., and fifteen undergraduate students. I strongly believe that mentorship is crucial to help students become successful scientists. As a mentor, I recognize that research can be a challenging and intricate journey, and my primary objective is to encourage students to think critically about their research questions and provide them with the resources they need to develop sound hypotheses and experimental plans. I work closely with students to develop competitive grant proposals, helping them refine their research questions, and craft compelling narratives. In my experience, mentorship is particularly crucial for undergraduate students who are new to the research process. By providing guidance and support, I help them to develop their research skills, understand the scientific process, and build confidence in their abilities. For graduate students, mentorship in the science of research is equally important, as it helps them to refine their research interests, develop a deeper understanding of their field, and become more independent researchers. Both graduate and undergraduate students in my lab have received research awards, including three Louisiana Space Consortium Undergraduate Awards (LURA), three LaSPACE Graduate Studies Research Awards (GSRA), three LBRN Summer Research Awards, and over twenty graduate, undergraduate, and travel ANS mini-grants. The accomplishments of my students have been recognized with four CBERS undergraduate scholarships, four CBERS graduate research awards, and the 2020 Davis-Flournoy Endowed Scholarship. In support of our research activities, my group has received a total of ~\$650,000 from external (federal and state) and internal sources.

I am dedicated to giving back to the Louisiana Tech University academic community by supporting the university's mission while engaging and supporting the wider community. Whether serving as a Program Chair, academic advisor, or committee member, I remain committed to helping students achieve their academic and career goals. In my role as Program Chair for the Ph.D. and M.S. MSNT Programs, I have embraced a leadership role in coordinating the curricula, overseeing admissions, and ensuring the overall success of the programs. I am committed to providing individualized support to students as an academic advisor and have served on over thirty Ph.D. and MS committees across multiple disciplines, including MSNT, Biology, and Engineering. My role as Chair of the MSNT Steering Committee has allowed me to develop and implement policies and procedures that foster the growth and development of these programs. Additionally, as an MSNT Program Chair, I am responsible for conducting annual institutional effectiveness audits to identify areas of strength and weakness and developing action plans to enhance the student experience and improve the programs. In addition to my contributions to the MSNT program, I am an active member of the School of Biological Sciences. I participate in committees focused on refining the curriculum learning objectives and developing relevant and up-to-date Pre-Med and Pre-Dent curricula to prepare students for admission to professional schools. I have also represented the MSNT program and the School of

Biological Sciences at various academic fairs, including the LSU Alexandria Graduate School Fair and the La Tech Graduate School Fair

Throughout my academic career at Louisiana Tech University, I have been deeply committed to community engagement and service. As an active participant in a range of outreach programs, I have sought to leverage my expertise and skills to make a meaningful impact on the wider community. In particular, I have organized scientific meetings and seminars, served on committees, and contributed to curriculum development and academic program assessment. One of the most rewarding experiences during my tenure at Louisiana Tech University was serving as an organizing committee member for the highly successful 2022 Health and Human Science Day. This event brought together students, faculty, and community members to showcase the latest research and developments in the health field, and I was thrilled to see so many people engaged and inspired by the work being done on campus. Looking forward, I am excited to continue making an impact on my community through my involvement in the upcoming 2024 Albany Conversations conference on the Louisiana Tech University campus, where I will be chairing a session. This is a tremendous opportunity for me to share my expertise with others and to contribute to the growth and development of my academic community. In addition to my involvement in these major events, I have also had the pleasure of participating in the 2023 Science Olympiad at Louisiana Tech University, where I led the Bio-Process lab for Division B and the Cell Biology event for Division C. I have also been deeply involved in the Speaking of Science program, which seeks to promote public engagement with science and technology in the state of Louisiana. Through this program, I have had the opportunity to present at the Louisiana Elementary Math Olympiad in Baton Rouge in 2019 and St. Mark's Cathedral School in Shreveport in 2021, sharing my knowledge and passion for science with younger generations.

My experience and dedication to academic excellence have allowed me to make significant contributions to Louisiana Tech University and its students. I remain fully committed to using my skills and expertise to serve the wider community, and I look forward to continuing my involvement in outreach programs and other forms of service. By doing so, I believe that I can make a meaningful contribution to society while also furthering my own academic and personal growth.

3. Selected List of Recent or Relevant Publications, Papers, Grants, and/or Presentations

A. Featured Research

- Our one-step gene sampling technology, designed for analysis on the International Space Station (ISS), was recently highlighted and discussed in an episode of the Louisiana Tech University Beyond 1894 podcast titled "Future Farmers of Our Solar System: Growing Gardens in Microgravity" (1894.latech.edu/podcast/).
- Elveflow, a leading provider of microfluidic solutions, featured the thermoelectric microfluidic platform developed by my lab on their website (www.elveflow.com/microfluidic-reviews/general-microfluidics/thermoelectric-sensor/), showcasing its unique capabilities and potential for a wide range of applications.

B. Invited Plenary Presentations

- **G.G. Nestorova**, N.D. Crews, R. Aquilina, A.K. Schramm, L. Anderson, T. Boone, M. Chin, T. Chin, L. Hee, D. Jelen, J. Shimada One-step gene sampling tool for genetic analysis on the ISS, 2021 Space Summit, Boston, MA, 09/2021.
- **G.G. Nestorova**, N.D. Crews, R. Aquilina, A.K. Schramm, L. Anderson, T. Boone, M. Chin, T. Chin, L. Hee, D. Jelen, J. Shimada, One-step gene sampling tool for genetic analysis on the ISS, 2021 Fall LaSPACE Council Meeting, Baton Rouge, LA, 10/ 2021.

C. Selected Peer-Reviewed Publications

- **G.G. Nestorova**, N. Crews, A. K. Schramm, R. A. Aquilina, M. Parra, M. Chin, T. Chinn, L. Hee, Spaceflight validation of one-step Gene Sampling tool for genetic analysis on the International Space Station, *Acta Astronautica*, 2022; 198: 225-232.
- F.B.Hossain*, S.M.I. Bari*, and **G.G.Nestorova**, Cell co-culture microfluidics platform with an integrated hydraulic valve for investigation of signal-mediated interactions in the blood-brain barrier, *Biomed Sci Instrum*, 2022; 58(3).

- C.D. Nwokwu*, A.Y. Xiao, L. Harrison, **G.G. Nestorova**, Identification of microRNA-mRNA regulatory network associated with oxidative DNA damage in human astrocytes, *ASN Neuro*, 2022;14.
- C. D. Nwokwu*, S. M. I. Bari*, K. H. Hutson*, C. Brausell*, **G. G. Nestorova**, ExoPRIME: Solid-phase immunoisolation and OMICS analysis of surface-marker-specific exosomal subpopulations, *Talanta*. 2022; 236: 122870.
- D. Gaines* and **G.G. Nestorova**, Extracellular vesicles-derived microRNAs expression as biomarkers for neurological radiation injury: risk assessment for space exploration, *Life Sciences in Space Research*. 2021.
- S.M.I. Bari*, F.B. Hossain*, **G.G. Nestorova**, Advances in Biosensors Technology for Detection and Characterization of Extracellular Vesicles. *Sensors*, 2021;21(22): 7645.
- K. H. Hutson*, K. Wilis*, C. D. Nwokwu*, M. Maynard, **G. G. Nestorova**, Photon versus proton neurotoxicity: Impact on mitochondrial function and 8-OHdG base-excision repair mechanism in human astrocytes, *Neurotoxicology*. 2021; 82:158-166.
- S. M. I. Bari*, T. Holland*, L. G. Reis, **G. G. Nestorova**, Numerical analysis of optimal design parameters for a cell co-culture microfluidic platform with an integrated pressure-controlled valve, *In ASME International Mechanical Engineering Congress and Exposition 2020*; 84607: V012T12A031. American Society of Mechanical Engineers.
- S. M. I. Bari*, L. G. Reis, and **G. G. Nestorova**, Numerical optimization of key design parameters of a thermoelectric microfluidic sensor for ultrasensitive detection of biochemical analytes. *Journal of Thermal Sciences and Engineering Applications*. 2020; 13(2).
- S. M. I. Bari*, L. Reis, and **G. G. Nestorova**, Calorimetric sandwich-type immunosensor for quantification of TNF- α . *Biosensors and Bioelectronics*. 2019; 126:82-87.
- **G. G. Nestorova**, K. Hasenstein, N. Nguyen, M. A. DeCoster, and N. D. Crews, Lab-on-a-chip mRNA purification and reverse transcription via a solid-phase gene extraction technique. *Lab on a chip*. 2017; 17(6): 1128-36.

D. Students Grants

- Ruth Stewart, Ph.D. MSNT: LaSPACE GRSA Extracellular vesicle-based therapeutics for reducing mitochondrial dysfunction in space. 08/15/2022-08/14/2023.
- Ruth Stewart, Ph.D. MSNT LaSPACE GRSA Astrocytes-derived exosomes for reducing neuronal oxidative DNA damage in space. 08/15/2021-08/15/2022.
- Faria Binte Hossain, MS MSNT LBRN Summer Research Program. Development of on-chip cell co-culture platform as a model of the blood-brain barrier. 06/01/2022-11/30/2022.
- Deriesha Gaines, Ph.D. MSNT LaSPACE GSRA: Long-term stability assessment of gene sampler tool for genetic analysis on ISS. 08/15/2021-08/15/2022.
- Saif Mohammad Ishraq Bari, PhD Engineering LBRN Summer Research Program: PineBio OMICS Bioinformatics training. 2020 (virtual due to COVID19 closure).
- Kristen H. Hope, MS MSNT Summer Research Program. PineBio OMICS Bioinformatics training. 2020 (virtual due to COVID19 closure).
- Kaitlyn Willis, BS Biology LaSPACE LURA: Effect of radiation on mitochondrial mass and oxidative activity. 09/01/2018-08/31/2019.
- Kaitlyn Willis, BS Biology LaSPACE LURA: Effect of radiation on the rate of mitochondrial DNA damage and repair. 09/2017-08/2018.
- Kristen H. Hope, BS Biology LaSPACE LURA: Effect of high-energy radiation on the formation of 8-hydroxydeoxyguanosine. 09/01/2018-08/31/2019.

E. Faculty Grants

- NSF EPSCoR RII Track-4 (PI) ExoPRIME Technology and Mass Spectroscopy Proteomic Analysis of Immunocaptured Exosomes for Liquid Biopsy. 01/2023-12/2024.

*Undergraduate and graduate students

- LaSPACE REA (PI) Gene Sampling Technology for Microbial Screening in Space.09/01/2022-08/31/2023.
- NASA EPSCoR International Space Station (ISS) Flight Opportunity (Science-I): One-step sampling tool to improve the ISS Bioanalytical Facility. 01/01/2019-12/31/2021.
- LaSPACE REA (PI): Exploring long-term chemistries for genetic analysis in space. 09/01/2018-05/31/2020.
- LaSPACE Research Enhancement Award Program (REA) (PI): Exosomal microRNA expression as biomarkers for assessment of the radiation-induced neurological injury. 09/01/2018-02/29/2020.
- Louisiana Board of Regents Research Competitiveness Subprogram (RCS) (PI): ExoSense: Lab-on-a-chip Platform for Solid-Phase Purification of Exosomes. 06/2018-06/2022.
- Board of Regents Support Fund Superior Graduate Fellows in Molecular Sciences and Nanotechnology 2016-2021 (Co-PI). 08/2016-07/2021. PI: Dr. Ramu Ramachandran.

G. Instrumentation Grants

- Louisiana Board of Regents Targeted Enhancement Program (co-PI): Atomic Force Microscope. 2022.
- IFM Research Innovation Initiative (Co-PI). Form labs 3D Printer. 2021.
- LaSPACE Special Supplement Competition: EVOS FL fluorescent microscope. 2020
- LBRN: Quant Studio 5 real-time PCR system. 2020.

G. Awards

- 2023 Research Award, College of Applied and Natural Sciences
- 2022 Nominated for Teaching Award for 300 Level and Above Courses, College of Applied and Natural Sciences
- 2021 Research Award, College of Applied and Natural Sciences
- 2021 James C. Jeffrey, M.D. Endowed Professorship in Pre-Med

4. Selected List of Relevant Community and/or University Service Activities

A. Service to University and College

- Session chair: 2024 Albany Conversations Conference at Louisiana Tech University.
- Organizing Committee: 2022 Health and Human Science Day at Louisiana Tech University
- Served as a faculty mentor in the 2022/23 Louisiana Tech Mentor/Mentee Program
- Faculty and staff candidate searches (Graduate School 2018-19, Biomedical Engineering 2021-22)
- Graduate Fairs to represent the MSNT Program (LSU Alexandria, La Tech Graduate Fair 2018-22).
- Chair of the MSNT Steering Committee (Fall 2017-present).
- School of Biological Sciences Committee Member (Curriculum Learning Objectives; Pre-Med/Pre-Dent Concentration;)

B. Service to the Profession

- Journal Editor for *Sensors*, special issue Biosensor Development and Innovation in Healthcare and Medical Applications, 2021-2022.
- NSF review panel, Experiential Learning for Emerging and Novel Technologies (ExLENT) (2022)
- NSF review panel, Engineering of Biomedical Systems Program (EBMS) (2021).
- Textbook reviewer *Integrative Endocrinology* by Alexander Schreiber, Oxford University Press (2021).
- 2021 Advance Placement (AP) Biology Fellow in Assessment: reviewed and provided an assessment of the current AP Biology exam to the College Board (2021).
- NIH review panel, ZRG1 IMST-M 55 R, PAR Panel: Innovative Research in Cancer Nanotechnology (2020).

C. Service to Community

- 2023 Science Olympiad at Louisiana Tech University (Div. B Bio-Process lab; Div. C Cell Biology).
- Speaking of Science (Louisiana Elementary Math Olympiad, Baton Rouge, 2019; St. Mark's Cathedral School, Shreveport, 2021).