

Gamze B. Bulut, PhD

gbbulut@vcu.edu • (214) 606-5846 • www.gamzebulut.com

ORCID: 0000-0002-8344-3338 • [Google Scholar](#)

EDUCATION

M.S., Biostatistics (Genomics Concentration)	2025-present
Virginia Commonwealth University (VCU), Richmond, VA	
Ph.D., Genetics and Development	2014
University of Texas Southwestern Medical Center, Dallas, TX	
<i>Dissertation: Ubiquitination of EpoR and p85 in Ligand-Induced EpoR Down-Regulation</i>	
B.Sc., Molecular Biology and Genetics	2007
Bilkent University, Ankara, Turkey	

PROFESSIONAL APPOINTMENTS

Assistant Professor of Bioinformatics	Aug 2025–present
School of Life Sciences and Sustainability, VCU, Richmond, VA	
Research Scientist / Lab Manager	May 2024 – Jun 2025
Department of Surgery, Turner and Findlay Laboratories, VCU, Richmond, VA	
Visiting Assistant Professor	2022–2024
Department of Biology, William & Mary, Williamsburg, VA	
Research Associate	2021–2022
Department of Pediatrics, VCU — Advisor: Judith Voynow, M.D.	
Postdoctoral Fellow	2017–2021
Cardiovascular Research Center, University of Virginia — Advisor: Gary K. Owens, Ph.D.	

TEACHING EXPERIENCE

Virginia Commonwealth University

Course	Title	Term	Students	Evaluation
BNFO 201	Computing Skills and Concepts for Bioinformatics (Python)	Fall 2025	25	4.65
BNFO 411	Ethical Issues in Life Sciences	Fall 2025	23	4.90
BNFO 301	Introduction to Bioinformatics — co-taught	Spring 2026	48	4.00
BNFO 420	Applications in Bioinformatics — capstone	Spring 2026	34	4.49

Course evaluations on a 5.00 scale; BNFO 301 was co-taught with Dr. B. Boyd across two sections (4.24 and 3.75); its score reflects both instructors and shared course design.

Graduate teaching assistants supervised: Maggie Kohn and Michael Healy (M.S. Bioinformatics) — trained and mentored in course delivery, lab instruction, and student assessment.

William & Mary

Course	Title	Terms	Students
BIOL 310	Molecular Cell Biology (two sections/term)	Fall 2022 – Spring 2024	377
BIOL 460	Diseases and Cures of the 2020s	Fall 2022, Fall 2023	30
BIOL 504	Diseases and Cures of the 2020s — graduate co-listed	Fall 2023	1
BIOL 404	Cell Biology Laboratory	Spring 2023, Spring 2024	22

BIOL 444	Mentored Biology Teaching — pedagogy mentorship	Fall 2022 – Spring 2024	27
BIOL 403	Research in Biology — research supervision	Fall 2023 – Spring 2024	9

Course evaluations rose across the appointment: overall course 4.07 → 4.12 → 4.20; teaching effectiveness 3.94 → 4.06 → 4.10

TECHNICAL EXPERTISE

- Genomics and computational — single-cell and single-nucleus RNA-seq analysis (Seurat); dimensionality reduction, clustering, and differential expression; pseudobulk and multi-omics integration; R, Python; biostatistical modeling and study design.
- High-dimensional cytometry — panel design through 18 colors; CyTOF panel design; FlowJo, FCS Express; phospho-flow; surface and intracellular staining.
- In vivo models — generation and maintenance of multi-allele transgenic lines; inducible lineage tracing; genotyping; tamoxifen induction; metabolic phenotyping (GTT, ITT); tissue harvest and perfusion.
- Cell and molecular biology — primary human monocyte-derived macrophage culture; lentiviral and siRNA knockdown; stable line generation; immunoprecipitation and co-IP; in vitro ubiquitination assays; protein expression and purification; RT-qPCR; cloning and site-directed mutagenesis.
- Imaging — confocal microscopy (Leica SP5, Zeiss LSM 700/710/880); 3D colocalization analysis (IMARIS); quantitative image analysis (ImageJ); immunohistochemistry.

PEER-REVIEWED PUBLICATIONS

16 peer-reviewed publications. Student co-authors marked with †.

1. Ahmed, N. T., A. B. Kummarapurugu, S. Zheng, **G. Bulut**, L. Kang, A. Batheja, A. Hawkrigde, and J. Voynow. “Neutrophil Elastase Targets Select Proteins on Human Blood Monocyte-Derived Macrophage Cell Surfaces.” *Int J Mol Sci* 25, no. 23 (Dec 4, 2024): 13038.
2. Karnewar, S., V. Karnewar, R. A. Deaton, L. S. Shankman, E. D. Benavente, C. M. Williams, X. Bradley, G. F. Alencar, **G. B. Bulut**, S. Kirmani, R. A. Baylis, E. R. Zunder, H. M. den Ruijter, G. Pasterkamp, and G. K. Owens. “IL-1 β Inhibition Partially Negates the Beneficial Effects of Diet-Induced Atherosclerosis Regression in Mice.” *Arterioscler Thromb Vasc Biol* 44, no. 6 (Jun 2024): 1379-92.
3. Zheng, S., **G. B. Bulut**, A. B. Kummarapurugu, J. Ma, and J. A. Voynow. “Neutrophil Elastase Degrades Histone Deacetylases and Sirtuin 1 in Primary Human Monocyte Derived Macrophages.” *Int J Mol Sci* 25, no. 8 (Apr 12, 2024).
4. Dunaway, L. S., M. A. Luse, S. Nyshadham, **G. Bulut**, G. F. Alencar, N. W. Chavkin, M. Cortese-Krott, K. K. Hirschi, and B. E. Isakson. “Obesogenic Diet Disrupts Tissue-Specific Mitochondrial Gene Signatures in the Artery and Capillary Endothelium.” *Physiol Genomics* 56, no. 2 (Feb 1, 2024): 113-27.
5. Zheng, S., A. B. Kummarapurugu, **G. B. Bulut**, A. Syed, L. Kang, and J. A. Voynow. “Neutrophil Elastase Activates the Release of Extracellular Traps from COPD Blood Monocyte-Derived Macrophages.” *Clin Transl Sci* 16, no. 12 (Dec 2023): 2765-78.
6. Deaton, R. A., **G. Bulut**, V. Serbulea, A. Salamon, L. S. Shankman, A. T. Nguyen, and G. K. Owens. “A New Autosomal Myh11-CreERT2 Smooth Muscle Cell Lineage Tracing and Gene Knockout Mouse Model — Brief Report.” *Arterioscler Thromb Vasc Biol* 43, no. 2 (Feb 2023): 203-11.
7. Shin, J., S. Tkachenko, M. Chaklader, C. Pletz, K. Singh, **G. B. Bulut**, Y. M. Han, K. Mitchell, R. A. Baylis, A. A. Kuzmin, B. Hu, J. D. Lathia, O. Stenina-Adognravi, E. Podrez, T. V. Byzova, G. K. Owens, and O. A. Cherepanova. “Endothelial Oct4 Is Atheroprotective by Preventing Metabolic and Phenotypic Dysfunction.” *Cardiovasc Res* 118, no. 11 (Aug 24, 2022): 2458-77.

8. Kim, M., N. T. Vu, X. Wang, **G. B. Bulut**, M. H. Wang, C. Uram-Tuculescu, R. Pillappa, S. Kim, and C. E. Chalfant. "Caspase 9b Drives Cellular Transformation, Lung Inflammation, and Lung Tumorigenesis." *Mol Cancer Res* 20, no. 8 (Aug 5, 2022): 1284-94.
9. **Bulut, G. B.**, G. F. Alencar, K. M. Owsiany, A. T. Nguyen, S. Karnewar, R. M. Haskins, L. K. Waller, O. A. Cherepanova, R. A. Deaton, L. S. Shankman, S. R. Keller, and G. K. Owens. "KLF4 (Krüppel-Like Factor 4)-Dependent Perivascular Plasticity Contributes to Adipose Tissue Inflammation." *Arterioscler Thromb Vasc Biol* 41, no. 1 (Jan 2021): 284-301.
10. Craig, J. E., J. N. Miller, R. R. Rayavarapu, Z. Hong, **G. B. Bulut**, W. Zhuang, S. M. Sakurada, J. Temirov, J. A. Low, T. Chen, S. M. Pruett-Miller, L. J. Huang, and M. B. Potts. "MEKK3-MEK5-ERK5 Signaling Promotes Mitochondrial Degradation." *Cell Death Discov* 6 (2020): 107.
11. Vu, N. T., M. A. Park, M. D. Shultz, **G. B. Bulut**, A. C. Ladd, and C. E. Chalfant. "Caspase-9b Interacts Directly with cIAP1 to Drive Agonist-Independent Activation of NF- κ B and Lung Tumorigenesis." *Cancer Res* 76, no. 10 (May 15, 2016): 2977-89.
12. Dutchak, P. A., S. Laxman, S. J. Estill, C. Wang, Y. Wang, Y. Wang, **G. B. Bulut**, J. Gao, L. J. Huang, and B. P. Tu. "Regulation of Hematopoiesis and Methionine Homeostasis by mTORC1 Inhibitor NPRL2." *Cell Rep* 12, no. 3 (Jul 21, 2015): 371-9.
13. **Bulut, G. B.**, R. Sulahian, H. Yao, and L. J. Huang. "Cbl Ubiquitination of p85 Is Essential for Epo-Induced EpoR Endocytosis." *Blood* 122, no. 24 (Dec 5, 2013): 3964-72.
14. Potts, M. B., H. S. Kim, K. W. Fisher, Y. Hu, Y. P. Carrasco, **G. B. Bulut**, Y. H. Ou, M. L. Herrera-Herrera, F. Cubillos, S. Mendiratta, G. Xiao, M. Hofree, T. Ideker, Y. Xie, L. J. Huang, R. E. Lewis, J. B. MacMillan, and M. A. White. "Using Functional Signature Ontology (FUSION) to Identify Mechanisms of Action for Natural Products." *Sci Signal* 6, no. 297 (Oct 15, 2013): ra90.
15. **Bulut, G. B.**, R. Sulahian, Y. Ma, N. W. Chi, and L. J. Huang. "Ubiquitination Regulates the Internalization, Endolysosomal Sorting, and Signaling of the Erythropoietin Receptor." *J Biol Chem* 286, no. 8 (Feb 25, 2011): 6449-57.
16. Huang, L. J., Y. M. Shen, and **G. B. Bulut**. "Advances in Understanding the Pathogenesis of Primary Familial and Congenital Polycythaemia." *Br J Haematol* 148, no. 6 (Mar 2010): 844-52.

MANUSCRIPTS IN PREPARATION

*Co-first authorship indicated with *; student first authors marked with †.*

- Gerveni, A.*, **Bulut, G. B.***, N. Dashti-Gibson, J. G. Trevino, J. C. Harrell, M. G. Dozmorov, and A. L. Olex. "multipletR: An Adaptive Threshold Method for Robust Multi-Species Multiplet Detection in Xenograft Single-Cell RNA-Sequencing." *Manuscript in preparation*. Co-author review complete; submission pending.
- Bulut, G. B.***, I. V. A. Pereira*, F. Mirshahi, M. Seneshaw, S. Hoang, T. Andl, E. Smirnova, and A. J. Sanyal. "Alcohol and the PNPLA3-I148M Variant Interact to Reprogram Hepatic Lipid and Amino-Acid Metabolism in Obese Mice." *Manuscript in preparation; to be submitted to Molecular Metabolism*.
- Ding, B.*, **Bulut, G. B.***, J. He, T. V. Nguyen, F. Imtiaz, T. Jones, M. E. Logan, B. Krisanits, N. Wages, R. Yamka, D. M. Raditic, J. W. Bartges, V. J. Findlay, and D. P. Turner. "Assessment of Advanced Glycation End Products in Commercially Available Dog Foods Using a Multi-Metric Analytical Approach." *Submitted to PLOS ONE, 2026* (PONE-D-26-36808).
- Bulut, G. B.**, G. F. Alencar, S. Tkachenko, O. A. Cherepanova, G. K. Owens, and M. G. Dozmorov. "Smooth Muscle Klf4 Shapes Adipose Tissue Macrophage Heterogeneity in Obesity" (working title). *Manuscript in preparation; to be submitted to Physiological Genomics*.

Patel, V., **Bulut, G. B.**, A. L. Olex, and M. G. Dozmorov. "Multiplet Detection Methods in Single-Cell Sequencing: A Review." *Manuscript in preparation*.

Khanna, R.† and **Bulut, G. B.** "Fasting and Diet-Induced Obesity Reshape Leptin Receptor–Expressing Hypothalamic Populations" (working title). *Manuscript in preparation; to be submitted to PLOS ONE*. († undergraduate co-author)

Manohar, A.†, Bulut, G. B. "A Modular Wrapper for Consensus Cell Type Annotation Across Single-Cell Tools and Reference Atlases" (Python package).

SOFTWARE

multipletR — R package for adaptive detection of human–mouse multiplets in patient-derived xenograft single-cell RNA-seq data. Co-developer with A. Gerveni; M. G. Dozmorov and A. L. Olex, senior authors.

Implements an adaptive threshold algorithm that, unlike fixed cutoffs, does not assume a balanced species mixture — correcting a common source of misclassification in real PDX data. Integrates with Seurat and SingleCellExperiment workflows. MIT licensed; documented with vignettes, unit tests, and a bundled PDX example dataset.

Submitted to Bioconductor, July 2026 — prechecks passed, package policies accepted, formal code review in progress (BiocContributions issue #101). <https://github.com/Bioconductor/BiocContributions/issues/101>

PUBLISHED ABSTRACTS AND CONFERENCE PRESENTATIONS (Student co-authors marked with †)

2026

Bulut, G. B.*, R. Loomba*, E. Smirnova, K. Yates, A. Samir, C. Sirlin, S. Sherlock, T. Kamphaus, P. Grebenstein, A. M. Diehl, K. Kowdley, B. A. Neuschwander-Tetri, D. Kleiner, B. Hatfield, R. A. Calle**, and A. J. Sanyal**. "Combinatorial Models of Biomarker Panels Reflecting Activity Versus Fibrosis Allow Identification of MASLD Sub-Phenotypes with High Precision." *The Liver Meeting 2026*, American Association for the Study of Liver Diseases, Denver, CO, November 6, 2026. Poster 2353, Diagnostics and Biomarkers – MASH session. NIMBLE consortium analysis (NIDDK NASH CRN, n = 764). (Presenting author; *co-primary authors, **co-senior authors)

Pereira, I. V. A.*, **Bulut, G. B.***, F. Mirshahi, M. Seneshaw, S. Hoang, T. Andl, E. Smirnova, and A. J. Sanyal. "Metabolic and Molecular Perturbations Underlying Metabo-Inflammatory-Necrotic Activity Induced by Alcohol Exposure in the Presence of Obesity with Metabolic Dysfunction and PNPLA3-I148M Mutation." *The Liver Meeting 2026*, AASLD, Denver, CO, November 7, 2026. Poster 3100. (Presenting author; *co-first authors)

Napoli, I.†, L. Sharma†, J. Johnson†, and **G. B. Bulut**. "Smooth Muscle Klf4 Promotes Spp1⁺ Macrophage Accumulation in Obese Adipose Tissue." *Intelligent Systems for Molecular Biology (ISMB) 2026*, HiTSeq Track, Washington, DC, July 2026. Integrated analysis of 12,045 macrophage-enriched cells from 16 10x libraries (Seurat v5, CellChat). (Senior author; † undergraduate co-authors)

Bulut, G. B., I. V. A. Pereira, S. Hoang, E. Smirnova, and A. J. Sanyal. "Alcohol Intake in Presence of PNPLA3 Mutation Leads to Elevated Amino Acid Metabolism in Liver Injury." *Keystone Symposia: Fueling MASH — Metabolic Drivers and Inflammatory Crosstalk*, April 2026. Integrated single-nucleus RNA-seq and UHPLC-MS metabolomics in AAV-PNPLA3-I148M DIAMOND mice. (First and presenting author)

Manohar, A.† and **G. B. Bulut**. "A Modular Wrapper for Consensus Cell Type Annotation Across Single-Cell Tools and Reference Atlases." *ISCB Great Plains*, September 28, 2026. (Submitted; senior author, † graduate student co-author)

Johnson, J.†, I. Napoli†, L. Sharma†, and **G. B. Bulut**. "Smooth Muscle KLF4 Promotes Spp1⁺ Macrophage Accumulation in Obese Adipose Tissue." *National Conference on Undergraduate Research (NCUR) 2026*, April 14, 2026. (Senior author; † undergraduate co-authors, all three presenting)

2025

Imtiaz, F., B. Ding, T. V. V. Nguyen, B. A. Krisanits, **G. Bulut**, B. Kaur[†], C. E. Senkal, S. Spiegel, N. Wages, V. J. Findlay, and D. P. Turner. “Abstract C080: Biosocial Disparities Drive Glycooxidation to Induce Adipocyte Differentiation in the Prostate Tumor Microenvironment.” *Cancer Epidemiol Biomarkers Prev* 34, no. 9_Supplement (Sep 18 2025): C080.

Earlier presentations

Voynow, J., **G. Bulut**, S. Zheng, and A. Kummarapurugu. “409 Neutrophil Elastase–Mediated Degradation of Histone Deacetylases in Macrophages Promotes High Mobility Group Box 1 Export from Nucleus to Cytosol.” *Journal of Cystic Fibrosis* 21 (2022): S238. (NACFC 2022)

Bulut, G. B., G. K. Owens, and G. Alencar. “Klf4-Dependent Plasticity of Perivascular Cells Regulates Obesity-Induced Inflammation and Endothelial Cell Polarization in Adipose Tissue.” *Arteriosclerosis, Thrombosis, and Vascular Biology* 40, Suppl. 1 (2020): A106. (ATVB Vascular Discovery Meeting — invited talk)

Bulut, G. B., G. Alencar, V. Serbulea, and G. K. Owens. “Klf4-Dependent Plasticity of Perivascular Cells Is Detrimental for Diet-Induced Obesity Associated Adipose Tissue Inflammation and Fibrosis.” *Circulation* 140, Suppl. 1 (2019): A13073. (AHA Scientific Sessions)

Single cell RNA sequencing of smooth muscle and pericyte derived macrophage-like cells within epididymal fat. *Gordon Research Conference, Vascular Biology, 2019. (Poster)*

Bulut, G. B. and A. T. Nguyen. “Identification of Smooth Muscle Derived Macrophages as a Novel Potential Source of Tissue Resident Macrophages.” *Arteriosclerosis, Thrombosis, and Vascular Biology* 38, Suppl. 1 (2018): A275.

Cbl ubiquitination of p85 is essential for Epo-induced EpoR endocytosis. *American Association for Cancer Research Annual Meeting, 2013. (Invited talk)*

GRANTS, FELLOWSHIPS, AND AWARDS

Award or fellowship	Amount	Year
VCU Undergraduate Research Opportunities Program — secured as faculty mentor for two undergraduates	\$4,000	2026
William & Mary Summer Research Grant	\$5,000	2023
Children’s Hospital Research Initiative Grant	\$7,000	2022
District of Columbia Women’s Board Postdoctoral Fellow	—	2020
American Heart Association Postdoctoral Fellowship	—	2019–2020
Cardiovascular Research Center T32 Fellowship	—	2017–2019
American Heart Association Predoctoral Fellowship	\$50,000	2012–2014
UT Southwestern Graduate Student Organization Travel Award	\$750	2013
UT Southwestern GSO Poster Session, Top 5 Poster Award	\$250	2010
Full undergraduate and graduate scholarship	—	2003–2014

RESEARCH MENTORING

Virginia Commonwealth University, 2025–present

Trainee	Level	Years	Project	Outcome
Isabella Napoli, Johana Johnson, Lavanya Sharma, Sanjana Varghese	Undergrad	2025–26	Adipose tissue macrophage heterogeneity in obesity [computational]	NCUR and ISMB 2026 posters; manuscript in preparation
Riya Khanna	Undergrad	2026	Leptin receptor–expressing cell crosstalk in obesity [computational]	Preparing first-author manuscript to PLOS ONE; VCU research fellowship

Sanjana Varghese	Undergrad	2026	Manuscript drafting, adipose macrophage project	VCU research fellowship
Ajay Manohar	M.S.	2026	Consensus cell-type annotation for scRNA-seq [computational]	ISCB Great Plains abstract; first-author manuscript
Andrew Sanford	M.S.	2026	RNA-seq analysis, joint project with Dr. S. Lima [computational]	CURE class genes list
Fariha Imtiaz, Ph.D.	Postdoc	2024–25	Advanced glycation end products, prostate tumor microenvironment [wet lab]	AACR 2025 abstract co-author
Bhoomika Kaur	High school	2024	Summer research [wet lab]	AACR 2025 abstract co-author

William & Mary, 2022–2024

Trainee	Level	Years	Project	Outcome
Beryl Jiang, Yuqi Pang	Undergrad	2023	Adipose macrophage heterogeneity, lean versus obese [computational]	Poster draft, honors thesis (committee member)
Mia Houdek	Undergrad	2024	Honors thesis, Biology	honors thesis (committee member)

University of Virginia, 2017–2021

Trainee	Level	Years	Project	Outcome
Melissa Luse	Ph.D. student	2019	scRNA-seq of mesenteric adipose tissue, endothelial lineage tracing [computational and wet lab]	Co-author, Dunaway et al., Physiological Genomics 2024
Lillian Waller, M.D.	Medical student	2018	Transgenic breeding, genotyping, metabolic testing, flow cytometry [wet lab]	Authorship on Bulut et al., ATVB 2021; now medical resident
Ana Tsiskarishvili, Sophia Kirmani	Undergrad	2019	Genotyping, immunofluorescence, atherosclerotic lesion analysis [wet lab]	Completed undergraduate research; contributed to lesion analysis dataset

PROFESSIONAL DEVELOPMENT

- CHS New Faculty Mentoring Series (2025–2026) — promotion, annual reporting, funding opportunities, research mentoring training.
- AI Summit for Faculty (2025); Generative AI in Teaching and Learning Series (2025).
- Non-Tenure Track Faculty Conference: Leveraging Teaching Excellence in Career Growth (2026).
- CHS Research Mentoring Training, Dr. Amanda Dickinson (2025).
- Course observation, BNFO 420 (Dr. Paul Fawcett), Fall 2025 — attended and assisted prior to assuming instruction of the capstone in Spring 2026.

SERVICE

VCU

- Search Committee Member, Tenure-Track Biomedical Research Faculty (2025–2026) — completed HR search training; screened 165 applicants across two rounds; participated in candidate interviews.
- Strategic Planning Subcommittee, SLSS (2025–2026) — drafted mission goals for Advancing Interdisciplinary Collaboration, Research Excellence, and Graduate Programs; developed an interactive map to help faculty identify collaborators.
- SLSS Research Day Committee Member (2026).
- Judge, 29th Annual Graduate Research Symposium (2026).
- Judge and project contributor, BNFOthon (2026).
- Guest lecturer, Medical Science Internship Program (2026).

- VCU Majors Fair (2025) and SLSS Preview Day (2026) — undergraduate recruitment and outreach.

Professional

- Abstract reviewer, National Conference on Undergraduate Research (NCUR) 2026 — reviewed 13 abstracts.
- Peer reviewer: Arteriosclerosis, Thrombosis, and Vascular Biology; Molecular Cancer Research; Journal of the American Heart Association (2 reviews, 2025–2026).
- Judge, Gordon Research Conference Best Graduate Student Poster Award.
- Session Co-chair, Gordon Research Conference on Vascular Biology, Ventura, CA (2019).

William & Mary

- Honors Thesis Committee: Beryl Jiang (Computer Science) and Mia Houdek (Biology), 2024.
- Session Chair, Graduate and Honors Research Symposium, 2023.
- Introductory Biology Welcome Session (2023) — co-designed an Ice Cream Social bringing ~400 introductory biology students into faculty offices.

Postdoctoral Training

- American Heart Association DC Women’s Board (2020) — represented funded research fellows at fundraising event.
- Panelist, Career Development Talk Series (2019) — balancing family and science.

PROFESSIONAL AFFILIATIONS

International Society for Computational Biology (ISCB)	2026–present
North American Vascular Biology Organization	2018–present
American Heart Association	2018–2022
Microcirculatory Society	2021–2022