JENNIFER MUNSON, PHD

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2020- **Associate Professor with Tenure**
Associate Director-Small Bore Preclinical Imaging Facility
Fralin Biomedical Research Institute at Virginia Tech-Carilion
Department of Biomedical Engineering & Mechanics
Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences
Wake-Forest Comprehensive Cancer Center, Wake-Forest Baptist Health
Institute for Critical Technology and Applied Science, Virginia Tech
Center for Engineered Health, Virginia Tech

2017-2020 **Assistant Professor**
Virginia Tech, Department of Biomedical Engineering and Mechanics, School of Engineering
Virginia Tech-Wake Forest School of Biomedical Engineering and Sciences
School of Neuroscience, Virginia Tech
Wake-Forest Comprehensive Cancer Center, Wake-Forest Baptist Health
Institute for Critical Technology and Applied Science, Virginia Tech
Center for Engineered Health, Virginia Tech

2014-2017 **Assistant Professor,** University of Virginia, Department of Biomedical Engineering, School of Medicine, School of Engineering and Applied Science, Charlottesville, VA

2011-2013 **Postdoctoral Associate,** Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland
Whitaker International Postdoctoral Fellowship, Whitaker Foundation
Advisor: Melody Swartz, PhD

2011 **Ph.D. in Bioengineering**
Georgia Institute of Technology, School of Chemical Engineering, Atlanta, GA
Advisor: Ravi Bellamkonda, PhD

2009-2010 **Fulbright Fellow,** Swiss Federal Institute of Technology, Lausanne, Switzerland
U.S. Department of State and the Swiss Confederation

2006-2007 **Engineer,** Genentech, Inc., South San Francisco, CA

2006 **B.S. Chemical Engineering and Neuroscience,** Magna cum laude with departmental honors
Tulane University, School of Engineering, New Orleans, LA

FELLOWSHIPS AND AWARDS

2019 Dean's Excellence Seminar Speaker, Cornell University
2019 Leader in Research, Department of Biomedical Engineering & Mechanics
2019 Dean's Award Outstanding New Assistant Professor, College of Engineering, Virginia Tech
2017 Young Innovator Award, Cellular and Molecular Bioengineering
2016 Rita Schaffer Young Investigator Award, Biomedical Engineering Society
2013 AICR Short Talk Award, Beatson International Cancer Conference, Glasgow, Scotland
2011-2013 Whitaker International Postdoctoral Fellowship, Whitaker Foundation
2007-2011 National Science Foundation Graduate Research Fellowship, NSF
2009-2010 Fulbright Fellowship, Department of State & Swiss Confederation
2007-2011 President's Fellowship, Georgia Institute of Technology
2006 Samuel L. Sullivan Award for Service and Scholarship, Tulane University
2006 American Chemical Society Outstanding Senior Award, Tulane University
2002-2006 Distinguished Scholars Award, Tulane University

RESEARCH

PUBLICATIONS (*CORRESPONDING)

1. JA McGuire, JL Monclova, AC Salazar Coaniti, CA Stine, KC Toussaint, **JM Munson**, DA Dillard, R DeVita*, Tear propagation in vaginal tissue under inflation. *Acta Biomaterialia.127: 193-204..*
2. T MacDonald, J Liu, A Malhotra**, JM Munson**, JC Park, K Wang, B Fei, RV Bellamkonda, JL Arbiser. Liposome-Imipramine Blue Inhibits Sonic Hedgehog Medulloblastoma In Vivo. *Cancers. In press.*
3. KC Chatterjee, N Atay, D Abler, P Sahoo, S Bhargava, RC Rockne, **JM Munson***. Utilizing Dynamic Contrast-Enhanced Magnetic Resonance Imaging (DCE-MRI) to Analyze Interstitial Fluid Flow and Transport in Glioblastoma and the Surrounding Parenchyma in Human Patients. *Pharmaceutics*. 13(2): 212.
4. JH Hammel, SR Cook, MC Belanger, **JM Munson***, RR Pompano*. Modeling Immunity in vitro: Slices, chips, and engineered tissues. *Annual Review of Biomedical Engineering*. *23.*
5. LM Roberts, **JM Munson***, Modulating microenvironments for treating glioblastoma, *Current Tissue Microenvironment Reports,* (2020) 1-13.
6. CT Curley, BP Mead, N Kim, K Negron, GW Miller, W Garrison, KM Kingsmore**, JM Munson**, A Klibanov, J Soo, J Hanes, RJ Price*, Blood-brain tumor barrier opening with MR image-guided focused ultrasound augments interstitial flow and facilitates nanoparticle-mediated transfection. *Science Advances*. 6(18): eaay1344 (2020).
7. KT Chatterjee, CM Esparza, JM Munson*, Measuring, manipulating and modeling fluid flow in the brain. *J Neuroscience Methods.* 333: 108541 (2020). https://doi.org/10.1016/j.jneumeth.2019.108541
8. S Galarza, H Kim, NJ Atay, SR Peyton*, JM Munson*, 2D or 3D? How in vitro cell motility is conserved across dimensions and predicts in vivo invasion. *Bioengineering & Translational Medicine.* E10148 (2019) DOI: 10.1101/627281.
9. CA Stine, **JM Munson**, Convection enhanced delivery: role of increased interstitial fluid flow. *Frontiers: Oncology*. 9: 966 (2019). DOI: 10.3389/fonc.2019.00966
10. **JM Munson**, Interstitial fluid flow under the microscope: is it a future drug target for high grade brain tumours such as glioblastoma? *Expert Opinion on Therapeutic Targets.* 23(9): 725-728 (2019). DOI: 10.1080/14728222.2019.1647167
11. EA Brooks, S Galarza, MF Gencoglu, RC Cornelison, **JM Munson**, SR Peyton, Applicability of drug response metrics for cancer studies using biomaterials. *Phil Transactions of the Royal Society B*. 374(1779), 20180226 (2019). DOI:10.1101/408583.
12. KM Tate, **JM Munson**, Assessing drug response in engineered neural microenvironments. *Brain Research Bulletin*. 150: 21-34 (2019). DOI: 10.1016/j.brainresbull.2019.04.027
13. S Shim, M Balanger, AR Harris, **JM Munson**, RR Pompano, Two-way communication between ex vivo tissues on a microfluidic chip: application to tumor-lymph node interaction. *Lab on a chip*. 19, 1013-1026 (2019). DOI: 10.1039/C8LC00957K .
14. RC Cornelison, CE Brennan†, KM Kingsmore, **JM Munson* "**Convective forces increase CXCR4-dependent glioblastoma cell invasion in GL261 murine model" *Scientific Reports, **8*** 17057 (2018)**.** DOI: 10.1101/451286
15. S Da Mesquita, A Louveau, A Vaccari, I Smirnov, RC Cornelison, KM Kingsmore, C Contarino, S Onengut-Gumuscu, E Farber, D Raper, KE Viar, W Baker, N Dabhi, G Oliver, S Rich, **JM Munson,** CC Overall, ST Acton, J Kipnis*, Meningeal lymphatics affect brain perfusion and underlie age-dependent cognitive decline and Alzheimer's pathology. *Nature*. (2018). *COVER.*
16. RC Cornelison, **JM Munson***. Perspective on Translating Biomaterials Into Glioma Therapy: Lessons From in Vitro Models. Frontiers in materials. 2018 May; 5(27).
17. Kingsmore KM, Vaccari A, Abler D, Cui SX, Epstein FH, RC Rockne, ST Acton, **JM Munson*** MRI analysis to map interstitial flow in the brain tumor microenvironment. Applied physics letters: Bioengineering. 2, 031905 (2018). Doi : 10.1063/1.5023503. *COVER.*
18. AR Harris, MJ Perez, **JM Munson**. Docetaxel facilitates lymphatic-tumor crosstalk to promote lymphangiogenesis and cancer progression. *BMC Cancer*. 2018 Jul 6;18(1):718. doi: 10.1186/s12885-018-4619-8. PubMed PMID: 29976154; PubMed Central PMCID: PMC6034223.
19. JX Yuan, AR Harris, **JM Munson** "Assessing multiparametric drug response in tissue engineered tumor microenvironment models" *Methods,* 134-135:20-31 (2017). doi: 10.1016/j.ymeth.2017.12.010.

20. JX Yuan, **JM Munson**, Quantitative immunohistochemistry of the cellular microenvironment in patient glioblastoma resections, *Journal of Visualized Experiments* 125 (2017). doi: 10.3791/56025.

21. DK Logsdon, GF Beeghly, **JM Munson**, Chemoprotection across the tumor border: cancer cell response to doxorubicin depends on stromal fibroblast ratios and interstitial therapeutic transport, *Cellular Molecular Bioengineering,* 1-19 (2017). doi: 10.1007/s12195-017-0498-3.

22. KM Kingsmore, DL Logsdon, BW Purow, **JM Munson**, Interstitial flow differentially increases patient-derived glioma stem cell invasion via CXCR4/CXCL12/CD44-mediated mechanisms, *Integrative Biology.* 8(12):1246-60 (2016) . DOI: 10.1039/c6ib00167j.

23. JX Yuan, FF Bafakih, JW Mandell, BJ Horton, **JM Munson**, Quantitative Analysis of the Cellular Microenvironment of Glioblastoma to Develop Predictive Statistical Models of Overall Survival, *Journal of Neuropathology and Experimental Neurology*. nlw090 (2016). doi:10.1093/jnen/nlw090.

24. BA Corliss, MS Azimi, **JM Munson**, SM Peirce, WL Murfee, Macrophages: An Inflammatory Link between Angiogenesis and Lymphangiogenesis, *Microcirculation.* 23(2): 95-121 (2016). doi: 10.1111/micc.12259.

25. **JM Munson,** AC Shieh, Interstitial fluid flow in cancer: implications for disease progression and treatment, *J Cancer Management and Research,* 6, 317-328 (2014). doi: 10.2147/CMAR.S65444.

26. **JM Munson**, RV Bellamkonda & MA Swartz, Interstitial flow increases glioma invasion via CXCR4-dependent autologous chemotaxis in a 3D microenvironment. *Cancer Research* 73(5): 1536-1546 (2013) doi: 10.1158/0008-5472.CAN-12-2838.

27. **JM Munson**, MY Bonner, L Fried, JL Arbiser, RV Bellamkonda, Identifying new small molecule anti-invasive compounds for glioma treatment. *Cell Cycle* 12 (14):1-10 (2013). doi: 10.4161/cc.25334.

28. BR Roller, **JM Munson**, PA Santangelo, B Brahma, RV Bellamkonda, Evans blue nanocarriers visually demarcate margins of invasive gliomas, *Drug delivery and Translational Research* 5(2): 116-24 (2015). doi: 10.1007/s13346-013-0139-x.

29. **JM Munson**, L Fried, SA Rowson, MY Bonner, L Karumbaiah, B Diaz, SA Courtneidge, UG Knaus, DJ Brat, JL Arbiser, RV Bellamkonda, Anti-invasive adjuvant therapy with Imipramine Blue enhances chemotherapeutic efficacy against glioma. *Science Translational Medicine* 4, 127ra36 (2012). doi: 10.1126/scitranslmed.3003016.

30. IC Clements, **JM Munson** & RV Bellamkonda, "Biomaterials for Neural Engineering," Biomaterials Science. 3rd ed., Elsevier Press, ed. B Ratner, 2012.

31. **JM Munson** & WT Godbey. "Gene Therapy," Biomedical Engineering Handbook: Tissue Engineering and Artificial Organs, 4th ed., CRC Press, ed. J. Fisher and A. Mikos, 2006.

MANUSCRIPTS UNDER REVIEW

1. RT Woodall, P Sahoo, Y Cui, BT Chen, MS Shiroishi, C Lavini, P Frankel, M Gutova, CE Brown, **JM Munson**, RC Rockne*. Repeatability of tumor perfusion kinetics from DCE-MRI in glioblastoma. *Neuro-oncology advances. Under review.*
2. AR Harris, MS Azimi, R Cornelison, FN Azar, DC Llaneza, M Belanger, A Mathew, Svyatoslav Tkachenko, S Esparza, MJ Perez, CB Rosean, RR Bostic, RC Cornelison, KM Tate, SM Peirce-Cottler, C Paquette, A Mills, CN Landen, J Saucerman, PM Dillon, RR Pompano, MA Rutkowski, **JM Munson***. Platinum Chemotherapy induces lymphangiogenesis to prime tissues for tumor metastasis, *Oncogene. Under review.* BioRxiv DOI: 10.1101/781443
3. R. C. Cornelison, J. X. Yuan, K. M. Tate, A. Petrosky, G. F. Beeghly, M. Bloomfield, S. C. Schwager, A. L. Berr, D. Cimini, F. F. Bafakih, J. W. Mandell, B. W. Purow, B. J. Horton, **J.M. Munson***. A patient-designed tissue-engineered model of the infiltrative glioblastoma microenvironment, *Nature Precision Oncology*. *Under review.* BioRxiv DOI: 10.1101/2020.10.02.322735
4. JE Ortiz-Cardenas, JM Zatorski, A Arneja, AN Montalbine, **JM Munson**, CJ Luckey, RR Pompano*, In situ photopatterning of cell laden biomaterials for spatially organized 3D cell cultures in a microfluidic chip. *Under review.*

5. JH Hammel, SR Cook, JM Zatorski, RR Pompano*, **JM Munson***. In vitro models of the immune system – from basic science to screening of therapeutics. *Advanced Drug Delivery Reviews. Under review*
6. O Turk, R Woodall, M Gutova, CE Brown, RR Rockne, **JM Munson***. Delivery strategies for cell-based therapies in the brain: overcoming multiple barriers. *Drug Delivery and Translational Research. Under review.*

PATENT

JM Munson, JA Arbiser, RV Bellamkonda, Nanocarrier therapy for treating invasive glioma. US Patent Number PCT/US2010/031914

CURRENT FUNDING

National Cancer Institute R37CA222563 $2,600,146 12/15/2017-11/30/2022
PI: Interstitial fluid flow regulates glioma cell invasion
Originally awarded as an R01 (2017-2022) and converted to an NCI MERIT Award so qualifies for 2 additional years of funding on top of the current funded amount (2022-2024).

National Institute of Bioimaging and Bioengineering $2,906,527 9/17/2019-9/30/2024
Co-I ($890,000 subaward)**:** A spatially organized microphysiological model of a human lymph node

REAP $50,000 10/1/2020-9/30/2022
Co-PI (Blaise Costa): Pharmacological Characterization of NMDA Receptor Modulators Using Engineered Microenvironments Representing Brain Disorders

National Institute of Neurological Disorders and Stroke R01NS115971-01A1 $4,147,089 4/1/2021-3/31/2026
Co-PI (Russell Rockne, Christine Brown): The impact of interstitial fluid flow on CAR T cell trafficking, distribution, and efficacy

National Institute on Aging R01 AG071661-01 $ 3,569,118 5/1/2021-4/30/2026
PI: Interstitial fluid flow in Alzheimer's Disease Progression

Ivy Foundation Emerging Leaders Award $500,000 7/1/2021-6/30/2023
PI: Patient specific therapies based on interstitial fluid flow

Lipedema Foundation $250,000 10/1/2021-9/30/2023
Co-PI (Evangelia Bellas): Characterization of biotransport through engineered lipedemic tissues

PENDING FUNDING

COMPLETED FUNDING

National Institute of Aging R37CA222563S2 $390,720 8/1/2019-11/30/2020
PI: Interstitial fluid flow in Alzheimer's Progression

Center for Engineered Health, ICTAS, Virginia Tech $15,000 10/15/2019-6/1/2020
PI: Biophysical outcomes of radiation treatment in glioblastoma

VT Provost Office New Faculty Mentoring Grant $1,500 2018-2020
PI: Attendance at Faculty Leadership Program, Boston, MA

School of Medicine Research and Development $25,000 6/1/2016-5/31/2017
PI: An in vitro model of the glioblastoma-neural interface

Cancer Center Transdisciplinary Project Award (University of Virginia) $100,000 12/1/2014-11/30/2016
Co-PI (Janet Cross): An engineered model of the premetastatic niche for mechanistic and therapeutic studies

American Cancer Society- Institutional Research Grant (ACS/University of Virginia) $25,000 12/2014-12/2015

PI: The Role of Interstitial Flow in Glioma Progression and Therapeutic Response

Coulter Foundation (University of Virginia) $140,000 7/1/2014-6/30/2016

PI: Screening system and decision-making strategy for brain cancer therapeutic intervention

Cancer Center Transdisciplinary Project Award (University of Virginia) $100,000 11/1/2014-10/31/2015

Co-I: Targeting radiation resistance in glioma

INVITED TALKS

2021: Mid-career biomechanics symposium, University of Florida
2020: World Congress of Biomaterials, Glasgow, Scotland (cancelled)
2020: University of Minnesota, Department of Biomedical Engineering, Mpls, MN
2019: City College New York Department of Biomedical Engineering, NY, NY
2019: Cornell University Department of Biomedical Engineering, Ithaca, NY
2019: Renssaeler Polytechnic Institute Department of Biomedical Engineering, Troy, NY
2019: University of Arkansas Department of Biomedical Engineering, Fayetteville, AR
2019: Society of Neuro-Oncology SCIDOT Annual Meeting, Phoenix, AZ
2019: NAVBO Vascular Biology, Pacific Grove, CA
2019: Society for Biological Engineering Bioengineering and Translational Medicine, Durham, NC
2019: Cancer and Cognition Group, Wake Forest School of Medicine, Winston-Salem
2019: Molecular Cellular Biology Program, University of Massachusetts-Amherst
2018: Computational Tissue Engineering Graduate Program, Virginia Tech, Blacksburg, VA
2018: Wake Forest Comprehensive Cancer Center, Winston-Salem, NC
2018: Biomedical Engineering Society Annual Meeting, Imaging and Instrumentation, Atlanta, GA
2018: 6th International Conference on Glial Biology in Medicine, Roanoke, VA
2018: World Congress of Biomechanics, Brain Biotransport, Dublin, Ireland
2018: Biotechnology Educators Conference, Biocomplexity Institute, Virginia Tech, Blacksburg, VA
2018: City of Hope Cancer Center, Los Angeles, CA
2017: Cellular and Molecular Bioengineering Young Innovators, BMES Annual Meeting, Phoenix, AZ
2017: Virginia Tech Department of Biomedical Engineering & Mechanics, Blacksburg VA
2017: Columbia University Department of Biomedical Engineering, New York, NY
2017: University of Michigan, Department of Biomedical Engineering, Ann Arbor, MI
2016: Biomedical Engineering Society Rita Schaffer Award Presentation, Minneapolis, MN
2016: University of Virginia, Department of Pathology, Charlottesville, VA
2016: University of Virginia, Department of Hematology/Oncology, Charlottesville, VA
2015: University of California San Francisco Cancer Center, San Francisco ,CA
2015: Virginia Commonwealth University Department of Chemical Engineering, Richmond, VA
2014: University of Virginia, Department of Neuroscience, Charlottesville, VA
2014: University of Virginia Cancer Center, Charlottesville, VA
2014: World Congress of Biomechanics, Boston ,VA

CONFERENCE PRESENTATIONS (PRESENTER; †UNDERGRADUATE AUTHOR)

1. N Atay, RC Cornelison, JX Yuan, **JM Munson**, The effect of interstitial fluid flow and astrocytes / microglia on invasion, proliferation and stemness of patient-derived glioma stem cells, Society for Neuro-Oncology Annual Meeting, Virtual, November 2020.
2. CM Esparza, LM Roberts, S Kancherla, RC Cornelison, **JM Munson**, The relationship between interstitial fluid flow and vasculature in murine tumors, BMES Annual Meeting, Virtual, October 2020
3. KT Chatterjee, DA Abler, RC Rockne, **JM Munson**, Magnetic Resonance Imaging And Analysis Of Interstitial Fluid Flow In Preclinical And Clinical Glioblastoma, Summer Biomechanics, Bioengineering and Biotransport Conference, Virtual, June 2020.
4. RC Cornelison, AR Petrosky, KM Tate, **JM Munson**, Glial Cells React to Heightened Fluid Forces By Upregulating Sphingosine-1-Phosphate Receptor 3, Summer Biomechanics, Bioengineering and Biotransport Conference, Virtual, June 2020.

5. CA Stine, **JM Munson**, Autologous CXCL12 gradient formation around single cells in the glioma microenvironment, Cancer Researchers UK-American Association for Cancer Researchers Joint Conference: Engineering and Physical Sciences in Oncology, London, England, October 2019.
6. AR Petrosky†, RC Cornelison, **JM Munson**, Effect of Interstitial Fluid Flow and Shear Stress on Glial Activation and S1P3 Expression, Biomedical Engineering Society Annual Meeting, Philadelphia, PA, October 2019.
7. CA Esparza, LM Roberts, RC Cornelison, **JM Munson** Changes in Blood Vasculature in response to over-expression of VEGFC in a murine model of glioma, NAVBO, Monterrey, CA, October 2019.
8. KM Tate, RC Cornelison, **JM Munso**n, Investigating S1PR3-mediated glioblastoma invasion mechanisms using 3D hydrogel - tissue model, Society for Neuro-Oncology Annual Meeting, November 2019.
9. **JM Munson,** Interstitial fluid flow in glioma motility and the microenvironment, Gordon Research Conference Physics of Cancer, Galveston, TX, 2019. Poster
10. **JM Munson,** Interstitial fluid flow defines features of the glioma microenvironment, Society for Neuro-oncology Annual Meeting, New Orleans, LA, 2018. Poster
11. RC Cornelison, JX Yuan, KM Kingsmore, CE Brennan†, **JM Munson**, Interstitial flow stimulates glial cells to promote glioma invasion: Implications for glioma therapy, BMES Annual Meeting, Atlanta, USA, 2018. Podium
12. **JM Munson**, SR Peyton, J Field 2D or not 2D: whether to culture MDAMB231 in the third dimension, BMES Annual Meeting, Atlanta, USA, 2018. Poster.
13. S Shim, AR Harris, **JM Munson**, RR Pompano, Microfluidic Device for Two-Way Tumor-Lymph Node Communication, BMES Annual Meeting, Atlanta, USA 2018.
14. CA Stine, KM Kingsmore, **JM Munson**, Design of an adapter for high-throughput interrogation of multiple interstitial flow velocities, BMES Annual Meeting, Atlanta USA 2018.
15. **JM Munson**, KM Kingsmore, Use of MRI to measure and map interstitial fluid flow in the glioma microenvironment: correlation to anatomical and histological features, BMES Annual Meeting, Atlanta, USA 2018.
16. KM Kingsmore, **JM Munson,** Quantifying interstitial fluid flow in glioblastoma using dynamic contrast enhanced MRI, Society for Neuro-oncology Annual Meeting, San Francisco, USA, 2017. Podium and poster.
17. RC Cornelison, JX Yuan, CE Brennan†, **JM Munson**, Shear stress and interstitial fluid flow modulate glial cell-mediated chemotaxis of glioma, Society for Neuro-oncology Annual Meeting, San Francisco, USA, 2017. Poster.
18. **JM Munson**, CMBE Young Innovator Award: Chemoprotection Across the Tumor Border: Cancer Cell Response to Doxorubicin Depends on Stromal Fibroblast Ratios and Interstitial Therapeutic Transport, BMES, Phoenix, USA, 2017. Podium invited.
19. JX Yuan, RC Cornelison, BW Purow, BJ Horton, **JM Munson**, A patient-designed glioblastoma microenvironment model to examine therapeutic response., BMES Phoenix, USA, 2017. Podium.
20. LS Sequeira†, JX Yuan, DK Logsdon, **JM Munson**, Agent-based modeling of the glioblastoma tumor microenvironment, BMES, Phoenix, USA, 2017. Poster, undergraduate.
21. GF Beeghly†, C Thomas†, JX Yuan, AR Harris, **JM Munson**, Engineering patient-driven models to examine breast cancer cell behavior after metastasis to the brain, BMES, Phoenix, USA, 2017. Poster, undergraduate.
22. **JM Munson**, Tissue engineered models for therapeutic testing, Virginia Nanosymposium, Charlottesville, USA, 2017. Oral Presentation.
23. RC Cornelison, JX Yuan, BJ Horton, **JM Munson**, Glial cell analysis in the brain tumor microenvironment elucidates contributions to glioblastoma patient progression, Summer Biomechanics, Bioengineering, and Biotransport Conference, Tucson, USA, 2017. Podium.
24. **JM Munson**, Rita Schaffer Award: Interstitial flow in the glioma microenvironment, BMES, Minneapolis, USA, 2016

25. RC Cornelison, KM Kingsmore, CE Brennan†, **JM Munson,** Invasion of GL261 Cancer Cells In Vivo is Regulated by Interstitial Flow and Depends on CXCR4 Signaling, BMES, Minneapolis, USA, 2016. Poster
26. MJ Perez, JV Cross, **JM Munson**, Flow Response of Myeloid-Derived Suppressor Cells in the Breast Tumor Microenvironment, BMES, Minneapolis, USA, 2016.
27. JX Yuan**, JM Munson,** Recapitulating the glioblastoma tumor microenvironment in a physiologically-relevant in vitro model, EACR Goodbye Flat Biology, Berlin, Germany, 2016, Poster. *Top rated abstract.*
28. KM Kingsmore, **JM Munson**, Interstitial flow increases patient-derived glioma stem cell invasion via CXCR4, CXCL12, and CD44-mediated mechanisms in distinctive cell populations, AACR-Engineering and Physical Sciences in Oncology, Boston, 2016, Poster.
29. RC Cornelison, KM Kingsmore, JX Yuan, BW Purow, **JM Munson**, Interactions of interstitial flow with the glioma microenvironment, Central Virginia Society for Neuroscience Meeting, Charlottesville, USA, 2016
30. AR Harris, **JM Munson,** Lymphatics in triple-negative breast cancer: contribution to chemotherapeutic efficacy in vitro and in vivo, AACR-Tumor Microenvironment Meeting, San Diego, CA, 2016. Poster
31. JX Yuan, KM Kingsmore, AS Berr†, **JM Munson,** Use of a patient-derived 3D glioblastoma model to assess the effect of microenvironmental factors on cancer invasion and response to radiotherapy, Biomedical Engineering Society Annual Meeting, Tampa, USA, 2015. Poster
32. KM Kingsmore, SX Cui, FH Epstein, **JM Munson**, Role of Interstitial Flow in Glioma Microenvironment as Assessed by Dynamic Contrast Enhanced MRI, Biomedical Engineering Society Annual Meeting, Tampa, USA, 2015. Poster
33. JX Yuan, FF Bafakih, BW Purow, **JM Munson**, Rational design of a 3D brain cancer model, Biomedical Engineering Society Annual Meeting, Tampa, USA, 2015. Podium Presentation
34. KM Kingsmore, JX Yuan, **JM Munson**, Interstitial flow and invasion response of human glioma stem cells in a physiologically relevant microenvironment. Beatson International Cancer Conference, Glasgow, UK, 2015. Oral presentation and poster
35. **JM Munson**, MAS Broggi IM Van Mier, MA Swartz, Lymphatic induced stromal activation identified in a 3D in vitro co-culture breast cancer model translates to similar findings in vivo using mouse models, Biomedical Engineering Society Annual Meeting, Tampa, 2015. Podium Presentation
36. JX Yuan, FF Bafakih, JW Mandell, **JM Munson**, Features of the cellular and extracellular microenvironment correlate with glioblastoma patient survival, American Association of Neuro-pathologists Annual Meeting, Denver, USA, 2015. Poster
37. AS Berr†, OC Cossio†, **JM Munson** Glioma Stem Cells Respond Differentially to Treatment in Tissue Engineered Brain Tumor Microenvironments. Biomedical Engineering Society Annual Meeting, San Antonio, USA, 2014. Poster
38. **JM Munson** Lymphatics and interstitial flow involvement in stromal activation: implications for therapy, World Congress of Biomechanics, Boston, MA, USA, 2014. Podium Presentation

Pre-2014

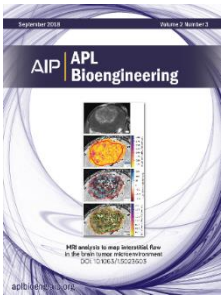
39. **JM Munson,** MA Swartz, Cancer lymphangiogenesis contributes to fibroblast activation via TGFβ production by lymphatics, Beatson International Cancer Conference, Glasgow, Scotland, 2013. Podium presentation
40. **JM Munson**, MA Swartz, Lymphatic endothelial cell-induced stromal stiffening caused by activation of fibroblasts in the tumor microenvironment, Cold Spring Harbor Asia/International Cancer Microenvironment Society Joint Conference on Tumor Microenvironment, Suzhou, China, 2012. Poster
41. **JM Munson,** VC Weaver, MA Swartz, Immunomodulation by biomechanical factors of the tumor stroma, Biomedical Engineering Society Annual Meeting, Atlanta, GA, 2012. Poster
42. T MacDonald, J Liu, **JM Munson**, J Park, K Wang, B Fei, R Bellamkonda, J Arbiser, The application of nanoparticle liposome-imipramine blue in the treatment of medulloblastoma in the SmoA1 transgenic mice,

Society for Neuro-oncology Annual Meeting, Toronto, ON 2012. (Published in *Neuro-oncology* **14(s1):**i82-i105). Poster

43. **JM Munson**, RK Khan, JL Arbiser, RV Bellamkonda, Imipramine Blue-Doxorubicin Co-Loaded Nanoparticles Increase Survival In Glioblastoma Over Doxorubicin Alone In a Single Treatment, American Institute of Chemical Engineers National Meeting, Minneapolis, MN 2011.
44. **JM Munson**, RV Bellamkonda, MA Swartz, Interstitial flow increases glioma cell migration via CXCR4/CXCL12 mediated autologous chemotaxis, American Institute of Chemical Engineers National Meeting, Minneapolis, MN, 2011.
45. **JM Munson**, RK Khan, SA Alkindi, RV Bellamkonda, Treatment of glioblastoma with co-loaded nanocarriers yields increased survival, Biomedical Engineering Society Annual Meeting, Hartford, CT, 2011.
46. **JM Munson**, R Machaidze, M Kaluzova, R Bellamkonda, CG Hadjipanayis, Use of doxorubicin and doxorubicin/imipramine blue coloaded nanoparticles yields survival in aggressive human glioblastoma in mice, Society for Neuro-oncology Annual Meeting, Anaheim, CA 2011. (Published in *Neuro-oncology* **13**:S3, CB-45)
47. BT Roller, **JM Munson**, B Brahma, RV Bellamkonda, Nanocarrier encapsulated visible dye for intraoperative brain tumor border delineation in an invasive glioblastoma model, Pediatric Technology & Surgery Research Forum Atlanta, GA, 2011
48. **JM Munson**, L Fried, JL Arbiser, RV Bellamkonda, Novel nano-encapsulated compound, Imipramine Blue, halts brain tumor invasion in vitro and in vivo, Georgia Life Science Summit, Atlanta, GA 2010.
49. **JM Munson**, U Haessler, RV Bellamkonda, MA Swartz, Interstitial fluid flow increases glioma invasion via a CXCR4-dependent mechanism, Society for Neuroscience Annual Meeting, San Diego, CA 2010.
50. **JM Munson**, JA Arbiser, RV Bellamkonda Liposome-encapsulated Imipramine Blue halts glioma invasion *in vivo,* Biomedical Engineering Society Annual Meeting, Austin, TX 2010.
51. **JM Munson**, L Fried, JA Arbiser, RV Bellamkonda Novel nanoparticle-delivered compound, Imipramine Blue, halts glioma invasion by affecting actin dynamics, American Assoc. for Cancer Researchers Annual Meeting, Washington, DC 2010.
52. **JM Munson**, E De Hitta, RK Khan, L Fried, JA Arbiser, RV Bellamkonda Nanocarriers for treatment of invasive glioma, Society for Biomaterials Annual Meeting, San Antonio, TX 2009.
53. **JM Munson**, W Hsu, Characterization of TubeSpin system for CHO culture, American Institute of Chemical Engineers National Meeting, San Francisco, CA 2006.

MEDIA COVERAGE

- "UVA Team wins $3.4 million NIH grant to develop mini-lymph node model" UVAToday 10/2019
- "Collaborative grant takes on brain cancer cell invasion" VTNews 1/2018
  - NPR Affiliate Roanoke: link
- "Study identifies possible treatment target for Alzheimer's, age-related cognitive decline" VTNews, 7/2018.
- "A First Look at Interstitial Fluid Flow in the Brain" American Institute of Physics, 7/2018.
- "Potential new treatment for deadliest brain diseases" NPR Affiliate Roanoke: link
- Covers :



TEACHING AND MENTORSHIP

COURSES

- **Instructor:** Graduate Seminar, Virginia Tech, Fall 2018-Spring 2020
- **Instructor:** Advanced Biological Transport, Virginia Tech, Fall 2018
- **Instructor:** Biotransport, University of Virginia, Spring 2017
- **Co-Instructor:** Integrative Design and Experimental Analysis Lab, University of Virginia, Spring 2015, 2016
- **Instructor:** Tissue Engineering, University of Virginia, Spring 2014, 2015, Fall 2016
- **Instructor:** Current Topics in Cancer Bioengineering, EPFL, School of life sciences, Spring 2013
- **Co-Instructor:** Intro to Chemical Processes, Georgia Tech, School of Chemical & Biomolecular Engineering, Spring 2011

PEDAGOGY

- **Attendee:** Course Design Institute, Teaching Resource Center, University of Virginia, June 2014
- **Tech to Teaching Certificate,** Center for enhancement of teaching and learning, Georgia Tech, 2011
- **Attendee:** Graduate Research Groups NSF-Sponsored Workshop, Arlington, VA, 2011
- **JM Munson**, LJ Taite, C Sievers, Technical writing as a tool to promote conceptual understanding, American Institute of Chemical Engineers National Meeting, Minneapolis, MN 2011.

UNDERGRADUATE STUDENT RESEARCHERS MENTORED

VIRGINIA TECH

- **c/o 2018:** Steven Tom
- **c/o 2020:** Alexis Petrosky
- **c/o 2021:** Saloni Bhargava, Conner Brocke, Zehra Demir
- **c/o 2022:** Lauren Pitz, Kate Herrema, Spencer Massey, Hannah Schwenker, Sruthi Kancherla, Ghaidaa Al Khafaji
- **c/o 2023:** Kaylie Maglicmot, Geo Umeadi, Shivanie Kodikalla
- **Visiting:** Richard Kline (Bridges to Baccalaureate), Gabryel Conley-Natividad, Beulah Dadala (Biotransport)

UNIVERSITY OF VIRGINIA

- **Mentor:** Capstone Senior Design, University of Virginia, 2014-2016 (12 students-5 projects)
- **c/o 2016:** Alexandra Berr (*Harrison Undergraduate Award*), Ossman Cossio, Melissa Skoff
- **c/o 2017:** Samantha Schwager, Nicholas Asby, Maya Singh, Candace Thomas, Garrett Beeghly (*Harrison Undergraduate Award*), Jillian Kirby
- **c/o 2018:** Caroline Brennan, Raju Arabandi
- **c/o 2019:** Nikhith Kalkunte, Elise Hoover, Sebastian Gutierrez, Lynette Sequeira

GRADUATE STUDENT RESEARCHERS MENTORED

VIRGINIA TECH

- **Caleb Stine:** Biomedical Engineering PhD Program
- **Kinsley Tate:** Biomedical Engineering PhD Program
- **Savieay Esparza:** Biomedical Engineering PhD Program, New Horizons Scholar
- **Naciye Atay:** Biomedical Engineering PhD Program
- **Cora Esparza:** Biomedical Engineering PhD Program, New Horizons Scholar, NSF Graduate Research Fellow
- **Jenn Hammel:** Biomedical Engineering PhD Program, ICTAS Fellow, New Horizons Scholar
- **Aileen Suarez:** Biomedical Engineering PhD Program, IMSD Fellow, New Horizons Scholar
- **Yamilet Macias-Orhuelas**: Biomedical Engineering PhD Program, New Horizons Scholar
- **Samantha Howerton**: Translational Biology Medicine and Health PhD Program
- **Zehra Demir:** Biomedical Engineering BS/MS Program
- **Conner Brocke:** Biological Systems Engineering, BS/MS Program

UNIVERSITY OF VIRGINIA

- **Jessica Yuan (2014-2018):** Biomedical Engineering PhD Program, NIH Cancer Center Training Grant
- **Kathryn Kingsmore (2014-2018):** Biomedical Engineering PhD Program, NSF Graduate Research Fellowship
- **Alexandra Harris, M.S (2014-2018).:** Pathology PhD Program, NIH Biotechnology Training Program
- **Daniel Logsdon (2015-2017):** Biomedical Engineering Master's Program

POSTDOCTORAL RESEARCH ASSOCIATES MENTORED

- **R. Chase Cornelison, Ph.D.** (PhD, UT Austin) Current: Assistant Professor UMass-Amherst
- **Krishnashis Chatterjee, Ph.D.** (PhD, Virginia Tech)
- **LaDeidra Monet Roberts, Ph.D.** (PhD, Cornell University)
- **Peng Jin, Ph.D.** (PhD, Seoul National University)
- **Gabriela Mendes, Ph.D.** (PhD, Texas A&M)

OTHER MENTEES

- **Olivia Turk,** PREP Program Scholar, 2020-2021

See where lab alumni are now

SERVICE AND LEADERSHIP

FIELD

- **2021:** Leadership Team, Virginia Tech Cancer Research Alliance
- **2020-2021:** Secretary, Council of Diversity Chairs Steering Committee
- **2020-:** Associate Editor, Annals of Biomedical Engineering
- **2023 (upcoming)**: Co-chair elect, Gordon Research Conference on Physical Sciences in Cancer
- **2021 (upcoming):** Vice chair, Gordon Research Conference on Physical Sciences in Cancer
- **2020 (ongoing):** Guest editor, Annals of Biomedical Engineering Special Issue: Bioengineering in Women's Health
- **2019:** Co-chair special session on Bioengineering in Women's Health, Biomedical Engineering Society Annual Meeting, Philadelphia, PA
- **2019-2021**: Junior Editor, Cells Organs and Tissues
- **2018:** Co-organizer, Mid-Atlantic Biomanufacturing Symposium, Charlottesville, VA
- **2016-2017:** National Science Foundation Graduate Research Fellowship Reviewer
- **2016-2017:** Integrated Molecular Analysis Technologies Study Section, National Cancer Institute
- **2016:** Session chair, Cellular motility, Biomedical Engineering Society
- **2015-2017:** Session chair, Cancer Technologies, Biomedical Engineering Society
- **2015-2017:** Session chair, Tissue engineering, Biomedical Engineering Society
- **2014-2016:** Review abstracts Biomedical Engineering Society Annual Meeting
- **2014-2015:** National Science Foundation Graduate Research Fellowship Reviewer
- **Reviewer for:** Cancer Research, Journal of Controlled Release, Integrative Biology, Molecular Cancer Therapeutics, Applied Physiology, Biochemical Engineering Journal, Biotechnology and Bioengineering, PLoSONE, Journal of Biomechanics, Trends in Biotechnology, Breast Cancer Research, Neuroscience, Breast Cancer Research, Science Advances

UNIVERSITY/DEPARTMENTAL

VIRGINIA TECH

- **2020-Present:** Associate Director, Small Animal Imaging Facility, Fralin Biomedical Research Institute
- **2020:** National Science Foundation Graduate Research Fellowship Workshop Organizer
- **2020:** Subgroup leader, Diversity and Inclusion, Fralin Biomedical Research Institute
- **2020:** Cardiovascular Research Search Committee, Fralin Biomedical Research Institute

- **2019-2021:** Chair, Inclusion and Diversity Committee, Biomedical Engineering & Mechanics
- **2019-2021:** Member, Undergraduate Curriculum Committee, Biomedical Engineering & Mechanics
- **2019-2021:** Member, College of Engineering Inclusion and Diversity Committee
- **2019-2021:** Group Leader, Cancer Bioengineering, Center for Engineered Health, ICTAS
- **2018:** Invited speaker seminar series organizer
- **2018:** CIMER Training for Graduate Mentorship (www.cimerproject.org)
- **2018:** Diversity Ally Certificate, Virginia Tech Human Resources and Professional Development
- **2018:** Women's welcome weekend attendee for recruitment
- **2018:** Student Transition Engineering Program Faculty Attendee (new student lunches)
- **2018:** Biomechanics and Biotransport summer research experience for undergraduates faculty mentor
- **2018:** Co-organizer, Center for Engineered Health Virginia Nanosymposium
- **2017:** Graduate Brown Bag Lunch Seminar, Biomedical Engineering
- **2017:** NSF Graduate Research Program Tips and Tricks, School of Engineering Seminar
- **2017-Present:** Cancer Journal Club, Biomedical Engineering & Mechanics

UNIVERSITY OF VIRGINIA

- **2016-2017:** Undergraduate curriculum committee
- **2015-2016:** Biotechnology Training Grant Faculty Coordinator Student Seminar Series
- **2015/16:** Faculty Search Committee, Cross-departmental Biomaterials
- **2014/15:** Faculty Search Committee, Biomedical Engineering
- **2013/14:** Graduate Admissions Committee, Biomedical Engineering
- **2014:** Strategic hiring initiative committee, Biomedical Engineering
- **2014-2017:** Judge Biomedical Sciences Poster Symposium, Huskey Graduate Symposium, Undergraduate Research Network Poster Session

COMMUNITY

- **KidsTech University,** Virginia Tech, January 2019
- **High School Outreach,** December 2018
- **Virginia Tech Science Festival,** Virginia Tech, October 2018
- **Roanoke STEAM Day**, City of Roanoke , September 2018
- **Biotechnology Educators Conference** Speaker (2018), Virginia Tech
- **TECHGirls** participant (2014-2017), University of Virginia
- **Society for Women Engineers** high school day speaker (2015-2017), University of Virginia

THESIS COMMITTEES

VIRGINIA TECH-WAKE FOREST

- **Maruf Hoque** (Advisor: John Chappell) TBMH Graduate Program
- **Zerin Khan** (Advisor: Scott Verbridge) Biomedical Engineering PhD Program
- **Joelle Martin** (Advisor: Harry Sontheimer) TBMH Graduate Program
- **Nastaran Alinezhadbalalami** (Advisor: Scott Verbridge) TBMH PhD Program
- **Nora Hlavac (**Advisor: Pam Vandevord) Biomedical Engineering PhD Program, Completed 2018
- **Shiny Rajan** (Advisor: Adam Hall/Alex Skardal) Biomedical Engineering PhD Program

UNIVERSITY OF VIRGINIA

- **Sameer Bajikar** (Advisor: Kevin Janes) Biomedical Engineering PhD Program, Completed 2016
- **Angela Zeigler** (Advisor: Jeff Saucerman) Biomedical Engineering MD/PhD, Completed 2017
- **Molly Kelly-Goss** (Advisor: Shayn Peirce-Cottler) Biomedical Engineering PhD Program, Completed 2018
- **Howard Clifton Ray** (Advisor: Paul Yates) Biomedical Engineering PhD Program, Completed 2018
- **Colleen Curley** (Advisor: Richard Price) Biomedical Engineering PhD Program, Completed 2019
- **Bruce Corliss** (Advisor: Shayn Peirce-Cottler) Biomedical Engineering PhD Program, Completed 2019

- **Natasha Sheybani** (Advisor: Rich Price) Biomedical Engineering PhD Program, Completed 2020
- **Jennifer Ortiz** (Advisor: Rebecca Pompano) Chemistry PhD Program, Completed 2021

PROFESSIONAL AFFILIATIONS AND ACTIVITIES

SOCIETY MEMBERSHIPS

Society for Neuro-Oncology
American Association of Cancer Researchers
Biomedical Engineering Society
Tau Beta Pi
Omega Chi Epsilon

OTHER TRAININGS

Introductory Course in Laboratory Animal Science, Lausanne Switzerland, EPFL, 2012 (80 hours)
Diversity Ally Certificate, Virginia Tech, January 2019 (30 hours)