DAVID J. WOOTEN, PHD
Curriculum Vitae

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104 Davey Lab, Box 5 | University Park, PA 16802

EDUCATION

2018 — Ph.D., Cancer Biology. Vanderbilt University, Nashville,TN
2008 — B.S., Mathematics. New Mexico Institute of Mining and Technology, Socorro, NM
2008 — B.S., Physics. New Mexico Institute of Mining and Technology, Socorro, NM

PROFESSIONAL EMPLOYMENT

2018 - present — Postdoctoral Scholar, Pennsylvania State University, Department of Physics, Mentor: Réka Albert, PhD

PUBLICATIONS

Dissertation

2018 — David J Wooten. Mathematical Modeling of Heterogeneity and Drug Response in Lung Cancer. Vanderbilt University (2018).

Refereed Journal Articles (* indicates co-authorship)

In revision — **Wooten DJ***, Meyer CT*, Quaranta V, Lopez CF. A Consensus Framework Unifies Multi-Drug Synergy Metrics. (*preprint: https://www.biorxiv.org/content/10.1101/683433v1*).

2020 — Meyer CT, **Wooten DJ**, Lopez CF, Quaranta V. Charting the fragmented landscape of drug synergy. *Trends Pharmacol Sci* (2020). doi:10.1016/j.tips.2020.01.011

2019 — **Wooten DJ***, Groves SM*, Tyson DR, Liu Q, Lim JS, Albert R, Lopez CF, Sage J, Quaranta V. Systems-level network modeling of Small Cell Lung Cancer subtypes identifies master regulators and destabilizers. *PLOS Computational Biology* (2019). p. e1007343. doi:10.1371/journal.pcbi.1007343

2019 — Meyer CT*, **Wooten DJ***, Paudel BB*, Bauer J, Hardeman KN, Westover D, Lovly CM, Harris LA, Tyson DR, Quaranta V. Quantifying Drug Combination Synergy along Potency and Efficacy Axes. *Cell Systems* (2019). pp. 97–108.e16. doi:10.1016/j.cels.2019.01.003

2019 — Mistry AM, **Wooten DJ**, Davis LT, Mobley BC, Quaranta V, Ihrie RA. Ventricular-Subventricular Zone Contact by Glioblastoma is Not Associated with Molecular Signatures in Bulk Tumor Data. *Scientific Reports*. (2019). doi:10.1038/s41598-018-37734-w

2017 — **Wooten DJ**, Quaranta V. Mathematical models of cell phenotype regulation and reprogramming: Make cancer cells sensitive again! *Biochimica et Biophysica Acta (BBA) - Reviews on Cancer* (2017). pp. 167–175. doi:10.1016/j.bbcan.2017.04.001

2017 — Udyavar AR*, **Wooten DJ***, Hoeksema M, Bansal M, Califano A, Estrada L, Schnell S, Irish JM, Massion PP*, Quaranta V*. Novel Hybrid Phenotype Revealed in Small Cell Lung Cancer by a Transcription Factor Network Model That Can Explain Tumor Heterogeneity. *Cancer Research* (2017). pp. 1063–1074. doi:10.1158/0008-5472.can-16-1467

AWARDS AND HONORS

2015 — Outstanding Abstract, Center for Quantitative Sciences Fall Retreat, Vanderbilt University October 13, 2015

2015 — Travel Award ($500) for Ninth q-bio Conference, Vanderbilt University, Graduate School, July 24, 2015

2015 — Travel Award ($500) for Ninth q-bio Conference, Vanderbilt University, Center for Quantitative Sciences, May 19, 2015

2008 — Graduation with Honors, New Mexico Institute of Mining and Technology, December, 2008

GRANTS AND FELLOWSHIPS

2014 - 2016 — Trainee, NIH T32 Pre-Doctoral Training Fellowship (5T32CA009592-27/28), Microenvironmental Influences in Cancer, Vanderbilt University

CONFERENCE ACTIVITY

Invited Talks

2020 — Reprogramming Cancer: Data-driven Approach Ranks Master Regulators of Drug Resistance. *Mathematics of Data Science, Minisymposium: Algebraic and Discrete Approaches in Data Science*, May 5-7, 2020

2019 — Local model of cancer subtypes identifies master regulators and destabilizers. *Society for Mathematical Biology Annual Meeting, Minisymposium: Mathematical modeling of cellular transitions en route metastasis: epithelial-mesenchymal plasticity and associated cellular traits*, July 21-26, 2019

2017 — Decoding Cell Identity from Models of Transcription Factor Networks. *Society for Mathematical Biology Annual Meeting, Minisymposium: Quantifying phenotypic plasticity in cancer cells*, July 17-20, 2017

Contributed Talks

2019 — **Wooten DJ**, Groves SM, Quaranta V, Albert R. Identifying master regulators and master destabilizers in gene regulatory networks with poorly constrained dynamics. *NetSci*, May 27-31, 2019

2018 — **Wooten DJ**, Meyer CT, Paudel BB, Harris LA, Lovly CM, Westover D, Tyson DR, Lopez CF, Quaranta V. Quantifying drug combination synergy along axes of potency and efficacy, *Systems Approaches to Cancer Biology Meeting*, November 7-10, 2018

2015 — **Wooten DJ**, Udyavar AR, Estrada L, Lopez CF, Massion PP, Quaranta V. Poster Spotlight: Transcription factor network supports phenotypic heterogeneity in cancer, *Ninth Annual q-Bio Conference*, August 5-8, 2015

Contributed Posters

2018 — Meyer CT, **Wooten DJ**, Paudel BB, Bauer J, Hardeman K, Westover D, Lovly CM, Harris LA, Tyson DR, Quaranta V. Quantifying drug combination synergy along potency and efficacy axes. *Cancer Systems Biology / Physical Sciences Oncology Network Investigators Annual Meeting*, September 25-26, 2018.

2018 — Maddox SF, **Wooten DJ**, Wandishin C, Kochen M, Pino J, Tyson DR, Lopez CF, Quaranta V. Regulation of a Chemoresistant Small Cell Lung Cancer Phenotype with

Immunosuppressive Properties. *Cancer Systems Biology / Physical Sciences Oncology Network Investigators Annual Meeting*, September 25-26, 2018.

2018 — **Wooten DJ**, Meyer CT, Paudel BB, Harris LA, Lovly CM, Westover D, Tyson DR, Lopez CF, Quaranta V. Unifying The Landscape of Drug Combination Synergy. *Joint Cancer Systems Biology / Physical Sciences Oncology Network Junior Investigator Meeting*, September 23-24, 2018.

2017 — **Wooten DJ**, Udyavar AR, Estrada L, Tyson DR, Lopez CF, Massion PP, Quaranta V. Heterogeneity and drug resistance in SCLC driven by dynamic transcription factor network. *Joint Cancer Systems Biology Consortium / Physical Sciences Oncology Network Junior Investigator Meeting*, July 11-12, 2017.

2017 — **Wooten DJ**, Udyavar AR, Estrada L, Tyson DR, Lopez CF, Massion PP, Quaranta V. Transcriptional Regulation of Heterogeneity and Drug Resistance in Small-Cell Lung Cancer. *The International Association for the Study of Lung Cancer: Small Cell Lung Cancer Workshop*, March 15-17, 2017.

2016 — **Wooten DJ**, Udyavar AR, Estrada L, Lopez CF, Massion PP, Quaranta V. Transcriptional Regulation of Heterogeneity and Drug Resistance in Small-Cell Lung Cancer. *First Annual Northeast Physical Sciences Oncology Network Meeting*, November 27-29, 2016.

2016 — **Wooten DJ**, Udyavar AR, Estrada L, Lopez CF, Massion PP, Quaranta V. A systems approach to heterogeneity in small-cell lung cancer reveals novel phenotypes and possible transcriptional drivers. *10th Annual q-Bio Conference*, July 27-30, 2016

2016 — **Wooten DJ**, Udyavar AR, Estrada L, Lopez CF, Massion PP, Quaranta V. Transcription factor network supports phenotypic heterogeneity and drug resistance in small cell lung cancer. *Systems Approaches to Cancer Biology Meeting*, April 3-6, 2016.

2015 — **Wooten DJ**, Udyavar AR, Estrada L, Lopez CF, Massion PP, Quaranta V. Transcription factor network supports phenotypic heterogeneity in cancer. *Ninth Annual q-Bio Conference*, August 5-8, 2015.

CAMPUS TALKS

2019 — Reprogramming Cancer: Data-driven Approach Ranks Master Regulators of Drug Resistance. *Pennsylvania State University, Cancer Research Day*, November 7, 2019

2017 — Quantifying synergy of efficacy and synergy of potency in drug combinations for cancer therapy. *Vanderbilt University, Science Hour*, November 9, 2017

2017 — Mathematical Modeling of Transcriptional Regulation of Heterogeneity in Small-Cell Lung Cancer Reveals Drug Resistant Subtypes and Possible Reprogramming Strategies. *Vanderbilt University, Core2Core*, March 28-29, 2017

2016 — A systems-level approach to small-cell lung cancer heterogeneity. *Vanderbilt University, Science Hour*, March 3, 2016

2015 — Transcription factor network supports phenotypic heterogeneity in small cell lung cancer. *Vanderbilt University, Center for Quantitative Sciences, Fall Retreat*, October 13, 2015

2015 — Math Model of Phenotypic Heterogeneity in Small Cell Lung Cancer, *Vanderbilt University, Science Hour*, March 25, 2015

TEACHING EXPERIENCE

Pennsylvania State University

2019 - present — TA: Elements of Network Science and its Applications (Fall 2019)
2019 - present — TA: Network Analysis of Biological Systems (Spring 2019)

Vanderbilt University

2017 — TA (Designed course): Introduction to Systems Biology (Spring 2017)
2016 - 2017 — TA (Designed course): Cancer Systems Biology (Spring 2016, Spring 2017)

University of Alaska Anchorage

2013 — Introduction to Complexity (Designed course, Spring 2013)
2012 — Physics Mechanics Lab (Fall 2012, several units)
2010 - 2013 — Beginning Algebra (2010 - 2013, several units)
2010 - 2013 — Pre-Algebra (2010 - 2013, several units)

SERVICE TO PROFESSION

Conference Organization

2018 — Co-chair of planning committee, Joint Cancer Systems Biology Consortium / Physical Sciences - Oncology Network Junior Investigator Meeting
2016 — Volunteer, 10th Annual q-Bio Conference, July 27-30, 2016

Manuscript Review

Science Advances
npj Systems Biology and Applications
Frontiers in Oncology
Journal of the Royal Society Interface
PeerJ

SERVICE TO UNIVERSITY

2019 - present — Member of Climate, Community, and Diversity Committee, Pennsylvania State University, Department of Physics

COMMUNITY OUTREACH

2011 - 2013 — Planetarium Docent, University of Alaska Anchorage

MEDIA COVERAGE

2019 — New algorithm calculates drug synergy; initial tests involve melanoma, lung cancer. Vanderbilt University (https://news.vanderbilt.edu/2019/02/20/new-algorithm-calculates-drug-synergy-initial-tests-involve-melanoma-lung-cancer/), February 20, 2019
2017 — Novel hybrid phenotype revealed in small cell lung cancer by a transcription factor network model that can explain tumor heterogeneity. F1000prime Article Recommendation by Réka Albert (https://f1000.com/prime/727089000), March 1, 2017

RELATED WORK

University of Alaska Anchorage

2011 - 2012 — Science Learning Specialist (Managed science tutoring center)
2010 - 2013 — Adjunct Instructor
2010 - 2012 — Tutor (University tutor for all levels of math, physics, computer science, chemistry and biology)

PROFESSIONAL AFFILIATIONS

2019 - present — Society for Mathematical Biology
2005 - present — Sigma Pi Sigma