# DANIEL A. SNELLINGS

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## EDUCATION

**Ph.D. Molecular Genetics and Microbiology** 2017 - 2022
Program in Cell and Molecular Biology
Duke University

**B.S. Biochemistry and Molecular Biology** 2013 - 2017
Pennsylvania State University

## RESEARCH

**The Role of Somatic Mutations in Vascular Malformations** 2017 - 2022
*Douglas A Marchuk, Duke University*
My work in the Marchuk Lab focuses on the genetic changes that lead to hereditary and sporadic neurovascular malformations. Specifically, I have shown that vascular malformations in Hereditary Hemorrhagic Telangiectasia follow a Knudsonian two-hit mechanism; and that cerebral cavernous malformations accumulate multiple synergistic somatic mutations which contribute to pathogenesis.

**Environmental Factors Influencing Bumblebee Pigmentation** Academic Year 2014 - 2017
*Heather M Hines, Pennsylvania State University*
In the Hines Lab I studied the mechanism of pigment biosynthesis and deposition in developing bumblebees. I also investigated the impact of foraging success and nutrient diversity on the pigment intensity of adult bees for potential use in the field as a bioindicator of nutritional fitness.

**The Mechanism of Cement Production in Barnacles** Summers 2015 - 2016
*Christopher M Spillmann, Naval Research Laboratory*
At the Naval Research Lab I worked with a group focused on understanding the mechanism of barnacle cement production and deposition with the ultimate goal of developing a hull coating which could prevent barnacle biofouling of naval vessels. Towards this end, I studied a previously undescribed tissue and helped characterize its role in barnacle development.

## PUBLICATIONS

* Authors contributed equally ORCID: 0000-0003-0615-9111

**2022**

**D. A. Snellings**, R. Girard, R. Lightle, A. Srinath, S. Romanos, Y. Li, C. Chen, A. A. Ren, M. L. Kahn, I. A. Awad, and D. A. Marchuk. Developmental venous anomalies are a genetic primer for cerebral cavernous malformations. *Nat Cardiovasc Res*, 1:246–252, 2022

F. Galeffi, **D. A. Snellings**, S.E. Wetzel-Strong, N. Kastelic, J. Bullock, C. J. Gallione, P. E. North, and D. A. Marchuk. A novel somatic mutation in *GNAQ* in Sturge-Weber Syndrome provides insight into disease pathogenesis. *Angiogenesis*, in press.

**2021**

**D. A. Snellings***, C. C. Hong*, A. A. Ren*, M. A. Lopez-Ramirez*, R. Girard*, A. Srinath*, D. A. Marchuk, M. H. Ginsberg, I. A. Awad, and M. L. Kahn. Cerebral Cavernous Malformation: From Mechanism to Therapy. *Circ Res*, 129(1):195–215, 2021

A. A. Ren*, **D. A. Snellings***, Y. S. Su, C. C. Hong, M. Castro, A. T. Tang, M. R. Detter, N. Hobson, R. Girard, S. Romanos, R. Lightle, T. Moore, R. Shenkar, C. Benavides, M. M. Beaman, H. Mueller-Fielitz, M. Chen, P. Mericko, J. Yang, D. C. Sung, M. T. Lawton, M. Ruppert, M. Schwaninger, J. Korbelin, M. Potente, I. A. Awad, D. A. Marchuk, and M. L. Kahn. PIK3CA and CCM mutations fuel cavernomas through a cancer-like mechanism. *Nature*, 2021

**2019**

**D. A. Snellings**, C. J. Gallione, D. S. Clark, N. T. Vozoris, M. E. Faughnan, and D. A. Marchuk. Somatic Mutations in Vascular Malformations of Hereditary Hemorrhagic Telangiectasia Result in Bi-allelic Loss of ENG or ACVRL1. *Am J Hum Genet*, 105(5):894–906, 2019

J. Koskimaki, D. Zhang, Y. Li, L. Saadat, T. Moore, R. Lightle, S. P. Polster, J. Carrion-Penagos, S. B. Lyne, H. A. Zeineddine, C. Shi, R. Shenkar, S. Romanos, K. Avner, A. Srinath, L. Shen, M. R. Detter, **D. Snellings**, Y. Cao, M. A. Lopez-Ramirez, G. Fonseca, A. T. Tang, P. Faber, J. Andrade, M. Ginsberg, M. L. Kahn, D. A. Marchuk, R. Girard, and I. A. Awad. Transcriptome clarifies mechanisms of lesion genesis versus progression in models of Ccm3 cerebral cavernous malformations. *Acta Neuropathol Commun*, 7(1):132, 2019

**2018**

M. R. Detter, **D. A. Snellings**, and D. A. Marchuk. Cerebral Cavernous Malformations Develop Through Clonal Expansion of Mutant Endothelial Cells. *Circ Res*, 123(10):1143–1151, 2018

C. Wang, J. N. Schultzhaus, C. R. Taitt, D. H. Leary, L. C. Shriver-Lake, **D. Snellings**, S. Sturiale, S. H. North, B. Orihuela, D. Rittschof, K. J. Wahl, and C. M. Spillmann. Characterization of longitudinal canal tissue in the acorn barnacle Amphibalanus amphitrite. *PLoS One*, 13(12):e0208352, 2018

## SOFTWARE

**gonomics** (github.com/vertgenlab/gonomics) Role: Developer
A collection of genomics software tools written in Go (golang).
My work in gonomics focuses on developing a somatic variant caller that operates on sequencing data aligned to traditional linear references as well as data aligned to genome graphs.

## FUNDING

**F31 NIH/NHLBI** (1F31HL152738-01) Role: PI April 2020 - March 2023
Investigating the Role of Somatic Mutations in Arteriovenous Malformations

## SELECTED PRESENTATIONS

**Angioma Alliance Scientific Meeting** November 2021
Plenary Talk: "Developmental Venous Anomalies are a Genetic Primer for Sporadic CCM"

**EMBO Workshop: Vascular Malformations** October 2021
Talk: "Developmental Venous Anomalies are a Genetic Primer for Cerebral Cavernous Malformations"

**American Society of Human Genetics 2021 Annual Meeting** October 2021
Featured Plenary Talk (Abstract 2021-A-1022-ASHG)
"Developmental Venous Anomaly: A genetic primer to *PIK3CA*-related neurological disease?"

**Invited Mission Bio Tapestri Webinar** February 2021
Talk: "Multiple Somatic Mutations in a Single Clonal Population Drive CCM Pathogenesis"

**Angioma Alliance 2020 Annual Scientific Meeting** November 2020
Talk: "Biallelic Somatic Mutation of *KRIT1*, *CCM2*, and *PDCD10* in Sporadic CCMs"

**American Society of Human Genetics 2020 Annual Meeting** October 2020
Poster 1720: "A Novel Mutation in *GNAQ* Identified in Sturge-Weber Syndrome"

**American Society of Human Genetics 2019 Annual Meeting** October 2019
Flash Talk: "A Genetic Two-Hit Mechanism Drives Vascular Malformation in HHT"

**American Society of Human Genetics 2019 Annual Meeting** October 2019
Poster 1238/F: "A Genetic Two-Hit Mechanism Drives Vascular Malformation in HHT"

**13th HHT International Scientific Conference** June 2019
Talk: "HHT Telangiectases Contain Biallelic Mutations in *ENG* or *ACVRL1*"

## OUTREACH

**Undergraduate Career Development Panel** October 2019
Served as a panelist detailing my path to graduate school and discussed career options with 1st year undergraduates.

**The Great Insect Fair** May 2016
Displayed samples and taught children about the importance of bumblebee coloration and the presence of color mimics in the wild.

## MENTORSHIP

**Jake Lowy, Rotation Student** 2021
**Duke CMB Peer Mentorship Program** 2021
**Jeff Reitano, Rotation Student** 2021
**Daichi Shonai, Rotation Student** 2021
**Makenzie Beaman, Rotation Student** 2020
**Taylor Anglen, Rotation Student** 2020
**Nicole Kastelic, Undergraduate Researcher** 2019 - 2020
**Makala Moore, Rotation Student** 2019
**Layne Clements, Undergraduate Summer Student** 2018

## REVIEWER

Cellular and Molecular Life Sciences, Communications Biology

## PROFESSIONAL MEMBERSHIPS

**American Society of Human Genetics** (ASHG) 2019 - Present
**American Heart Association** (AHA) 2019 - Present
**American Association for the Advancement of Science** (AAAS) 2019 - 2021

## HONORS AND AWARDS

**Chancellor's Award for Research Excellence** Duke University February 2022
**Best Talk (2nd)** EMBO Workshop: Vascular Malformations October 2021
**Charles J. Epstein Award Semifinalist** ASHG 2021 Annual Meeting October 2021
**Reviewers Choice Abstract** ASHG 2019 Annual Meeting October 2019
**Best Scientific Oral Presentation** 13th HHT International Scientific Conference June 2019
**Molecular Genetics and Microbiology Travel Award** Duke University April 2019
**Eberly College of Science Research Award** Pennsylvania State University November 2016
**Apes Valentes Research Award** Center for Pollinator Research, Penn State May 2015