

# DANIEL A. SNELLINGS

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## EDUCATION

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| <b>Ph.D. Molecular Genetics and Microbiology</b><br>Program in Cell and Molecular Biology<br>Duke University | 2017 - Present |
| <b>B.S. Biochemistry and Molecular Biology</b><br>Pennsylvania State University                              | 2013 - 2017    |

## RESEARCH

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|---|---------------------------|
| <b>The Role of Somatic Mutations in Vascular Malformations</b><br><i>Douglas A Marchuk, Duke University</i><br>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. | 2017 - Present            |
| <b>Environmental Factors Influencing Bumblebee Pigmentation</b><br><i>Heather M Hines, Pennsylvania State University</i><br>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.   | Academic Year 2014 - 2017 |
| <b>The Mechanism of Cement Production in Barnacles</b><br><i>Christopher M Spillmann, Naval Research Laboratory</i><br>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.                  | Summers 2015 - 2016       |

## PUBLICATIONS

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\* Authors contributed equally

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### 2021

**D. A. Snellings** , R. Girard, R. Lightle, A. Srinath, S. Romanos, Y. Li, C. Chen, A. A. Ren, M. L. Kahn, I. A. Awad, D. A. Marchuk. Developmental Venous Anomalies are a Genetic Primer for Cerebral Cavernous Malformations. *Nature Cardiovascular Research*, in press

**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. Korbelen, 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 Biallelic 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. Schultzhause, 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

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**gonomics** ([github.com/vertgenlab/gonomics](https://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.

**weaver** ([github.com/ddsnellings/weaver](https://github.com/ddsnellings/weaver)) Role: Creator & Developer

An open source toolkit for analyzing sequencing data generated by the Tapestry platform.

## FUNDING

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**F31 NIH/NHLBI** (1F31HL152738-01) Role: PI April 2020 - March 2023

Investigating the Role of Somatic Mutations in Arteriovenous Malformations

## SELECTED PRESENTATIONS

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**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?”

<b>Invited Mission Bio Tapestri Webinar</b>	February 2021
Talk: "Multiple Somatic Mutations in a Single Clonal Population Drive CCM Pathogenesis"	
<b>Angioma Alliance 2020 Annual Scientific Meeting</b>	November 2020
Talk: "Biallelic Somatic Mutation of <i>KRIT1</i> , <i>CCM2</i> , and <i>PDCD10</i> in Sporadic CCMs"	
<b>American Society of Human Genetics 2020 Annual Meeting</b>	October 2020
Poster 1720: "A Novel Mutation in <i>GNAQ</i> Identified in Sturge-Weber Syndrome"	
<b>American Society of Human Genetics 2019 Annual Meeting</b>	October 2019
Flash Talk: "A Genetic Two-Hit Mechanism Drives Vascular Malformation in HHT"	
<b>American Society of Human Genetics 2019 Annual Meeting</b>	October 2019
Poster 1238/F: "A Genetic Two-Hit Mechanism Drives Vascular Malformation in HHT"	
<b>13th HHT International Scientific Conference</b>	June 2019
Talk: "HHT Telangiectases Contain Biallelic Mutations in <i>ENG</i> or <i>ACVRL1</i> "	

## OUTREACH

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<b>Undergraduate Career Development Panel</b>	October 2019
Served as a panelist detailing my path to graduate school and discussed career options with 1st year undergraduates.	
<b>The Great Insect Fair</b>	May 2016
Displayed samples and taught children about the importance of bumblebee coloration and the presence of color mimics in the wild.	

## MENTORSHIP

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

## REVIEWER

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Cellular and Molecular Life Sciences, Communications Biology

## PROFESSIONAL MEMBERSHIPS

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

## HONORS AND AWARDS

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