

DEVIN P BENDIXSEN

The University of Edinburgh | MRC Human Genetics Unit | Institute of Genetics and Cancer

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ACADEMIC APPOINTMENTS

2022-Present **Bioinformatician**
MRC Human Genetics Unit | Institute of Genetics and Cancer
The University of Edinburgh, Edinburgh, Scotland, UK
Supervisor: Colin Semple, Head of Bioinformatics



2021-2022 **Researcher**
2018-2021 **Wenner-Gren Postdoctoral Fellow**
2018 **Postdoctoral Fellow**
Department of Zoology | Division of Population Genetics
Stockholm University, Stockholm, Sweden
Supervisor: Rike Stelkens, Associate Professor



EDUCATION

2014-2018 **PhD Biomolecular Sciences**
Boise State University Supervisor: Eric Hayden, Associate Professor
Dissertation | *Empirical Investigations of RNA Fitness Landscapes: Harnessing the power of high-throughput sequencing and evolutionary simulations*

2014-2017 **MS Biomolecular Sciences**
Boise State University Supervisor: Eric Hayden, Associate Professor

2012-2014 **MS Natural Resource Ecology and Management**
Oklahoma State University Supervisor: Stephen Hallgren, Associate Professor
Thesis | *Causes and Effects of Oak Decline in an Upland Oak-hickory Forest of Eastern Oklahoma*

2009-2012 **BS Agricultural Biology (Applied Biology), Distinction in University Honors**
2006-2007 Minors: Chemistry, Biology
New Mexico State University Supervisor: Jane Pierce, Professor
Honors Thesis | *Influence of Tree Size on Susceptibility to Pecan Nut Casebearer in New Mexico*

PEER-REVIEWED PUBLICATIONS

- 1) Bautista, C., I. Gagnon-Arsenault, M. Utrobina, A. Fijarczyk, **D. P. Bendixsen**, R. Stelkens & C. R. Landry, Hybrid adaptation is hampered by Haldane's sieve. **bioRxiv**, **Nature Communications** (*in press*).
- 2) Roberts, J. M., J. Beck, T. Pollock, **D. P. Bendixsen** & E. J. Hayden, RNA sequence to structure analysis from comprehensive pairwise mutagenesis of multiple self-cleaving ribozymes. **eLife**. 12:e80360 (2023).
- 3) Ament-Velásquez*, S. L., C. Gilchrist*, A. Rêgo, **D. P. Bendixsen**, C. Brice, J. Grosse-Sommer, N. Rafati, & R. Stelkens, The dynamics of adaptation to stress from standing genetic variation and *de novo* mutations. **Molecular Biology and Evolution**. 39(11):msac242 (2022). *authors contributed equally to this work.
- 4) Tavakolian, N., J. Frazão, **D. P. Bendixsen**, R. Stelkens & C. B. Li, Shepherd: Accurate Clustering for Correcting DNA Barcode Errors. **Bioinformatics**. 38(15):3710-3716 (2022).
- 5) Stelkens, R., & **D. P. Bendixsen**, The evolutionary and ecological potential of yeast hybrids. **Current Opinion in Genetics and Development**. 76:101958 (2022).
- 6) **Bendixsen, D. P.**, J. Frazão & R. Stelkens, *Saccharomyces* yeast hybrids on the rise. **Yeast**. 39(1-2):40-54 (2022).
- 7) **Bendixsen, D. P.**, D. Peris & R. Stelkens, Patterns of genomic instability in yeast hybrids with diverse ancestries. **Frontiers in Fungal Biology**. 2:742894 (2021).
- 8) Brice, C., Z. Zhang, **D. P. Bendixsen** & R. Stelkens, Hybridization outcomes have strong genomic and environmental contingencies. **The American Naturalist**. 197(3):E53-E67 (2021).
- 9) **Bendixsen, D. P.**, T. B. Pollock, G. Peri & E. J. Hayden, Experimental resurrection of ancestral mammalian CPEB3 ribozymes reveals deep functional conservation. **Molecular Biology and Evolution**. 38(7):2843-2853 (2021).
- 10) **Bendixsen*, D. P.**, N. Gettle*, C. Gilchrist, Z. Zhang & R. Stelkens, Genomic evidence of an ancient East Asian divergence event in wild *Saccharomyces cerevisiae*. **Genome Biology and Evolution**. 13(2):evab001 (2021). *authors contributed equally to this work.
- 11) Hudon, S. F., E. P. Hurtado, J. D. Beck, S. J. Burden, **D. P. Bendixsen**, K. R. Callery, J. S. Forbey, L. P. Waits, R. A. Miller, O. K. Nielsen, J. A. Heath & E. J. Hayden, Primers to highly conserved elements optimized for qPCR-based telomere length measurement in vertebrates. **Molecular Ecology Resources**. 21(1):59-67 (2021).

- 12) Batllori, E., T. Aakala, W. Anderegg, E. Aynekulu, **D. P. Bendixsen**, A. Bentouati, C. Bigler, C. Burk, J. Camarero, Michele Colangelo, J. Coop, R. Fensham, M. L. Floyd, L. Galiano, J. Ganey, P. Gonzalez, A. L. Jacobsen, J. M. Cane, T. Kitzberger, C. Bariloche, J. C. Linares, S. B. Marchetti, G. Matusick, M. Michaelian, R. M. Navarro-Cerrillo, R. B. Pratt, M. D. Redmond, A. Rigling, F. Ripullone, G. Sangüesa-Barreda, Y. Sasal, S. Saura-Mas, M. L. Suarez, T. T. Veblen, A. Vilà-Cabrera, C. Vincke, & B. Zeeman, Forest and woodland replacement patterns following drought-related mortality. **Proceedings of the National Academy of Science**. 202002314 (2020).
- 13) **Bendixsen, D. P.**, S. W. Hallgren & J. A. Burton, Understorey vegetation response to forest decline in a xeric oak forest of south-central United States. **The Southwestern Naturalist**. 64(3) (2020).
- 14) **Bendixsen, D. P.**, J. Roberts, B. Townshend & E. J. Hayden, Phased nucleotide inserts for sequencing low-diversity RNA samples from *in-vitro* selection experiments. **RNA** 26:1060-1068 (2020).
- 15) **Bendixsen***, **D. P.**, Z. Zhang*, T. Janzen, A. Nolte, D. Greig & R. Stelkens, Recombining your way out of trouble: The genetic architecture of hybrid fitness under environmental stress. **Molecular Biology and Evolution**. Msz211 (2019). **authors contributed equally to this work.*
- 16) **Bendixsen, D. P.**, J. Collet, B Østman & E. J. Hayden, Genotype network intersections promote evolutionary innovation. **PLoS Biology**. 17(5):e3000300 (2019).
- 17) **Bendixsen, D. P.**, B Østman & E. J. Hayden, Negative epistasis in experimental RNA fitness landscapes. **Journal of Molecular Evolution**. 85(5-6):159-168 (2017).
- 18) **Bendixsen, D. P.**, S. W. Hallgren & J. A. Burton, Ecological succession following forest decline in a xeric oak forest of south-central United States. **Journal of Plant Ecology**. 9(4) 402-409 (2016).
- 19) Hayden, E. J., **D. P. Bendixsen** & A. Wagner, Intramolecular phenotypic capacitance in a modular RNA molecule. **Proceedings of the National Academy of Science**. 112, 12444-12449 (2015).
- 20) **Bendixsen, D. P.**, S. W. Hallgren & A. E. Frazier, Stress factors associated with forest decline in xeric oak forests of south-central United States. **Forest Ecology and Management**. 347, 40–48 (2015).

PUBLICATIONS (UNPUBLISHED PREPRINTS/ IN REVIEW)

- 1) Ewing, A., A. Meynert, R. Silk, S. Aitken, **D. P. Bendixsen**, M. Churchman, S. L. Brown, A. Hamdan, J. Mattocks, G. R. Grimes, T. Ballinger, R. L. Hollis, C. S. Herrington, J. P. Thomson, K. Sherwood, T. Parry, C. Bartos, I. Croy, M. Ferguson, M. Lennie, T. McGoldrick, N. McPhail, N. Siddiqui, S. Dowson, R. Glasspool, M. Mackean, F. Nussey, B. McDade, D. Ennis, The Scottish Genomes Partnership, L. McMahon, A. Matakidou, B. Dougherty, R. March, J. C. Barrett, I. A. McNeish, A. V. Biankin, P. Roxburgh, C. Gourley & C. A. Semple, Divergent trajectories to structural diversity impact patient survival in high grade serous ovarian cancer. **bioRxiv** (*in review*).

PUBLICATIONS (IN PREPARATION)

- 1) **Bendixsen***, **D. P.**, F. Semple*, A. Ironside, N. Wilson, C. A. Semple & O. Oikonomidou, Mutational landscape dynamics of triple negative breast cancer during neoadjuvant chemotherapy treatment. (*in prep*).
- 2) **Bendixsen***, **D. P.**, F. Semple*, C. A. Semple & O. Oikonomidou, Uncommon presentations of triple-negative breast cancer with genomic foundations: A case report. (*in prep*).
- 3) **Bendixsen, D. P.** & C. A. Semple, Illuminating the 'long tail' of high-grade serous ovarian cancer (*in prep*).
- 4) **Bendixsen, D. P.**, S. Aitken, M. Halachev, S. Fox, J. Su, A. MacPherson, K. G. Blyth & C. Semple, Charting the mutational landscape of malignant pleural mesothelioma via uniform re-analysis of published patient cohorts (*in prep*).
- 5) **Bendixsen, D. P.**, C. Gilchrist, C. Haberkorn, K. Persson, C. Gejjer, J. Warringer & Rike Stelkens, Divergent selection causes reproductive isolation and vast genomic instability in hybrids between experimentally evolve yeast populations (*in prep*).

FELLOWSHIPS & GRANTS | TOTAL ~\$145,555

2024	Tenovus Scotland Pilot Grant <i>Using long-read sequencing to reveal clinically relevant structural variation in formalin-fixed cancer samples</i> ~\$32,600
2022	Moray Endowment Fund Grant – The University of Edinburgh <i>Illuminating the 'long tail' of high-grade serous ovarian cancer</i> ~\$2,320
2022	The University of Edinburgh - Institute of Genetics and Cancer Early Career Researchers Travel Grant ~\$1,240
2022	Alice and Lars Siléns Foundation Grant <i>Structural variation and aneuploidy in hybrid yeast</i> ~\$560
2019-2021	Wenner-Gren Postdoctoral Fellowship for Education in Sweden (Foreign Postdoctoral) <i>Experimental Evolution in Yeast: Investigation of a novel hybridization fitness landscape</i> ~\$81,000
2019	Alice and Lars Siléns Foundation Grant <i>Evolutionary capacitance in yeast hybrids revealed by environmental stress</i> ~\$1,035
2017	RiboWest RNA Society Travel Grant ~\$200

2016	National Science Foundation – Improving Graduate Student Preparedness for Entering the Workforce Supplemental Funding \$13,000
2016	Idaho State University Molecular Research Core Facility (MRCF) Seed Grant <i>Uncovering Functions of the Gut Microbiome and the Consequences of Host Diet: A Metagenomic Analysis of Mule Deer</i> \$1,000
2013	The Afanasiev Distinguished Graduate Fellowship Award \$1,000
2006-2012	Howard Hughes Medical Institute Undergraduate Research Scholars Program ~\$11,600

RESEARCH EXPERIENCE

2022-Present	Staff Bioinformatician	The University of Edinburgh
2021-2022	Researcher	Stockholm University
2018-2021	Wenner-Gren Postdoctoral Fellow	Stockholm University
2018	Postdoctoral Fellow	Stockholm University
2014-2018	Graduate Research Assistant	Boise State University
2012-2014	Graduate Research Assistant	Oklahoma State University
2006-2012	Howard Hughes Medical Institute Research Scholar	New Mexico State University

TEACHING APPOINTMENTS

2020-2022	Guest Lecturer	Stockholm University
	<i>Evolutionary Biology</i>	
2019-2022	Course Teacher	Stockholm University
	<i>Analysis and Presentation of Biological Data</i>	
2014-2016	Graduate Teaching Assistant	Boise State University
	<i>General Biology I Lab</i>	
2010-2011	Peer Teaching Assistant	New Mexico State University
	<i>Cellular and Organismal Biology</i>	

SUPERVISING EXPERIENCE

PhD students: I have co-supervised three PhD students at Stockholm University.

Alexandre Rêgo : Experimental evolution to describe the origin, dynamics, and outcomes of adaptation to novel environments in yeast.

João Frazão : The role of hybridization in influencing adaptation and the application of fitness landscape theory to model and predict that process.

Nik Tavakolian (Department of Mathematics) : The mathematical modeling of a novel hybridization fitness landscape derived from empirical high-throughput data.

MS students: I have co-supervised one MS student at Boise State University and one MS student at Stockholm University.

James Collet : Developing ultra-high throughput sequencing-based assay for ligase ribozymes for the study of evolutionary innovations.

Lara Beckmann : The evolution of telomere length in yeast populations adapted to stressful conditions.

Undergraduate students: I have co-supervised one undergraduate student at Boise State University.

Tanner Pollock : High-throughput mutational analysis of six self-cleaving ribozymes.

SELECTED TALKS/ SEMINARS

- 1) Edinburgh Next Generation of Genomics Symposium (ENGoGS) **2024** | One Health Genomics Edinburgh - *Mapping the mutational landscape of malignant pleural mesothelioma via uniform re-analysis of published patient cohorts*, Edinburgh, Scotland, UK
- 2) Biomedical Genomics Section Meeting **2024** | MRC Human Genetics Unit, The University of Edinburgh – *Mutational landscape dynamics of triple negative breast cancer during neoadjuvant chemotherapy treatment*, Edinburgh, Scotland, UK
- 3) Biomedical Genomics Section Meeting **2023** | MRC Human Genetics Unit, The University of Edinburgh - *Charting the longitudinal mutational landscape of triple negative breast cancer*, Edinburgh, Scotland, UK
- 4) Biomedical Genomics Section Meeting **2022** | MRC Human Genetics Unit, The University of Edinburgh - *Deciphering the mutational landscape of high-grade serous ovarian cancer*, Edinburgh, Scotland, UK
- 5) Functional Regulatory Genomics and Disease **2022** | Genetics Society - *Identifying driver variants within the mutational landscape of high-grade serous ovarian cancer*, Edinburgh, Scotland, UK
- 6) Biomedical Genomics Section Meeting **2022** | MRC Human Genetics Unit, The University of Edinburgh - *Genomic Instability in Interspecific Yeast Hybrids with Diverse Ancestries*, Edinburgh, Scotland, UK
- 7) Evolution **2021** - *The genomic architecture of Saccharomyces yeast hybrids*, virtual
- 8) Department of Zoology, Postdoc Seminar **2021** | Stockholm University - *The genomic architecture and instability of Saccharomyces yeast hybrids*, Stockholm, Sweden

- 9) RNA **2021** - *High-throughput experimental characterization of resurrected mammalian ribozymes reveals functional conservation over millions of years*, virtual
- 10) Yeast Meeting **2019** | Stockholm University - *Experimental evolution in Yeast : Telomeres and Barcodes*, Stockholm, Sweden
- 11) Bloodbath Conference **2019** | Stockholm University - *Evolutionary role of yeast telomere length variation in response to stress*, Tovetorp, Södermanland, Sweden
- 12) Bloodbath Conference **2018** | Stockholm University - *Evolution of biomolecular innovations at the intersection of two RNA functions*, Tovetorp, Södermanland, Sweden
- 13) Research Computing Days **2018** | Boise State University - *Modeling the evolution of innovation on experimental fitness landscapes*, Boise, Idaho, USA
- 14) RiboWest RNA Society **2017** - *The Evolution of Biomolecular Innovations: Exploring the Intersection of Two Ribozyme functions*, Vancouver, British Columbia, Canada
- 15) Biomolecular Sciences Seminar Series **2017** | Boise State University - *The Evolution of Biomolecular Innovations: Exploring Ribozyme Fitness Landscapes*, Boise, Idaho, USA
- 16) Natural Resource Ecology and Management Seminar Series **2014** | Oklahoma State University - *Effects of oak decline in an upland oak-hickory forest of Eastern Oklahoma*, Stillwater, Oklahoma, USA
- 17) Howard Hughes Medical Institute Research Scholar Conference **2011** - *Influence of Tree Size on Susceptibility to Pecan Nut Casebearer in New Mexico*, Las Cruces, New Mexico, USA

INTERNATIONAL CONFERENCES

- Mutations in Time and Space, Edinburgh, Scotland, UK, **2024**
- Cancer Genomics, Heidelberg, Germany, **2023**
- Genome Informatics, Cold Spring Harbor Laboratory, NY, USA, **2023**
- Edinburgh Breast Cancer Special Symposium, Edinburgh, UK, **2023**
- Molecular Analysis for Precision Oncology, European Society for Medical Oncology, Amsterdam, Netherlands, **2022**
- Genome Informatics, Cambridge, UK, **2022**
- Functional Regulatory Genomics and Disease, Genetics Society, Edinburgh, UK, **2022**
- Society of Molecular Biology and Evolution, virtual, **2021**
- Evolution, virtual, **2021**
- RNA, virtual, **2021**
- EMBL Conference: Molecular Mechanisms in Evolution and Ecology, virtual, **2020**
- LRU: Long-Read Sequencing, Uppsala, Sweden, **2019**
- RiboWest RNA Society, Vancouver, BC, Canada, **2017**
- Evolution, Portland, OR, USA, **2017**
- RNA, Berkeley, CA, USA **2017**
- Ecological Society of America, Sacramento, CA, USA, **2014**
- Entomological Society of America, San Diego, CA, USA, **2010**

SERVICE AND OUTREACH

2022	Scientist Volunteer, Cancer Zone - I'm a Scientist, Get me out of here. Edinburgh, Scotland, UK
2018	Executive Secretary National Aeronautics and Space Administration (NASA) Exobiology Review Panel San Diego, California, USA
2017-2018	Founding President of Boise State University Biomolecular Sciences Graduate Student Association (BMOL-GSA) Boise, Idaho, USA

AWARDS & ACCOMPLISHMENTS

- Biomolecular Sciences Graduate Programs Outstanding Student of the Year **2017**
- Boise State University Graduate Student Showcase - Best BMOL Student Poster Presentation Award **2017**
- RiboWest RNA Society Travel Award **2017**
- RiboWest RNA Society Runner Up Talk Award **2017**
- 11th Annual New Mexico State University Research Council Fair Award Winner **2011**
- New Mexico State University Dean's List **2006, 2007, 2010, 2011**
- New Mexico State University Crimson Scholar **2006, 2007, 2010, 2011**

EXTERNAL COURSES AND WORKSHOPS

- Cancer Genomics and Transcriptomics *EMBL-EBI Training* **2024**
- Wellcome Genome Campus/ Cancer Research UK *Pathway to Independence Programme* **2023**

- University of Oxford *Statistical Genomics Summer School* **2023**
- Software Carpentry *Intro to R and RStudio for Genomics* **2022**
- Wellcome Connecting Science *Genomics for Educators* **2022**
- Physalia Workshop *Comparative Genomics* **2020**
- Software Carpentry *Python, Git, Unix* **2017, 2018**
- Cold Spring Harbor Laboratory Course *Computational and Comparative Genomics* **2016**

PEER REVIEWING SERVICES

Nature Communications, Molecular Biology and Evolution, PLoS Genetics, Genetics
GENETICS Peer Review Training Program

PROFESSIONAL MEMBERSHIPS

- European Association for Cancer Research
- European Society for Medical Oncology
- Genetics Society
- Society for Molecular Biology and Evolution
- Genetics Society of America
- Society for the Study of Evolution
- RNA Society