Matthew Christopher Hale
Curriculum Vitae

Department of Biology
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ACADEMIC BACKGROUND

Education

PhD 2007 University of Sheffield, Genetics
MS 2002 Imperial College, London, Advanced Methods in Taxonomy and Biodiversity
BS 2001 Roehampton University, Zoology with Honors

Appointments

Aug 2020 - present **Associate Professor**, Department of Biology, Texas Christian University, Fort Worth, Texas.
Aug 2014 – Apr 2020 **Assistant Professor**, Department of Biology, Texas Christian University, Fort Worth, Texas.
Aug 2013 - Aug 2014 **Instructor**, Department of Biology, Purdue University, West Lafayette, Indiana.
Aug 2009 - Aug 2013 **Postdoctoral Researcher**, Department of Biology, Purdue University, West Lafayette, Indiana, *advisor*: Dr. Krista M Nichols.
Sep 2007 - Aug 2009 **Postdoctoral Researcher**, Department of Forestry and Natural Resources, Purdue University, West Lafayette, Indiana, *advisor*: Dr. J Andrew DeWoody.
Mar 2007 - Sep 2007 **Research Assistant**, Department of Animal and Plant Sciences, University of Sheffield, UK, *advisor*: Dr. Terry Burke.

TEACHING

Courses Taught

Associate Professor, Texas Christian University, Department of Biology, Fall 2020 to present

- Biology 10503 (Fall semester 2020 and 2021): *Introductory Biology I.* A team-taught introductory biology course focusing on the cellular components of life. My classes focused on the molecular components of heredity.
- Biology 40123 (both semesters since 2022): *Genetics*. An upper-level course covering many topics in Genetics, from the basics of inheritance to molecular genetics, to quantitative, evolutionary, and population genetics.
- Biology 60723 (both semesters since 2023) *Advanced Genetics*. A graduate level course that builds on the material taught in 40123.
- Biology 40723 (Fall semester): *Genomics*. An upper-level course focusing on the roles next generation sequencing plays in biology. This course includes a lab component, where students get hands on experience with large next-generation sequence datasets
- Biology 50313 (Fall semester): *Evolution*. A combined upper-level undergraduate/graduate student course that focuses on the major tenants of organic evolution. The course includes both an organism and a molecular focus on evolution.

- Biology 60133 (Spring semester: 2023-2025): *Scientific Communication*. A graduate level seminar-based course that focuses on teaching students competency both in written grantsmanship and in delivering scientific presentations.
- Biology 60121 (Fall semester 2025): *Professional Development*. A graduate level seminar designed to cover topics in professional development.

Assistant Professor, Texas Christian University, Department of biology, Fall 2014 to spring 2020

- Biology 10503 (Fall semester 2014 and 2018 - 2020): *Introductory Biology I.* A team-taught introductory biology course focusing on the cellular components of life. My classes focused on the process of Photosynthesis, and the molecular components of heredity.
- Biology 40123 (Spring semester): *Genetics*. An upper level course covering many topics in Genetics, from the basics of inheritance, to molecular genetics, to quantitative, evolutionary, and population genetics.
- Biology 70950 (Spring semester): *Evolutionary and Population Genetics*. A graduate level discussion course designed to critique the literature.
- Biology 40723 (Fall semester): *Genomics*. An upper level course focusing on the roles next generation sequencing plays in biology. This course includes a lab component, where students get hands on experience with large next-generation sequence datasets.
- Biology 60121 (Fall semester): *Professional Development*. A graduate level seminar designed to cover topics in professional development.

Instructor, Purdue University, Department of Biology, Fall 2013 to August 2014.

- Biology 241 (Fall 2013): *Genetics*. A sophomore level course covering introductory genetics.
- Biology 286 (Spring 2014): *Ecology and Evolution*. A sophomore level course covering the basics process of evolution (speciation, population genetics, phylogenetics), and ecology (mutualism, predation, population dynamics).
- Biology 587 (Spring 2014): *Discussion in Evolution*. A team-taught graduate level discussion course on evolution. My sections covered quantitative trait loci and linkage mapping analysis, use of association genetics in non-model populations, and sex-bias in gene expression.
- Biology 101 (Summer 2014): *Introductory Biology I*. Introductory Biology course that focused on the molecular basis of life. Classes focused on the fields of Genetics and Physiology, and covered topics such as transcription, translation, immunology, and lung function.

Guest Lecturer

Texas Christian University, Department of Biology, Spring 2015 – present.

- Conservation Genetics (spring 2015, 2017, 2019, 2021), upper level undergraduate and graduate course.

Purdue University, Department of Biology, Fall 2008-Spring 2011.

- Molecular Ecology (Fall 2008, and Fall 2010), graduate level course.
- Advanced Ornithology (Spring 2009), graduate level course.
- Seminar in Evolutionary Genetics (Fall 2009), graduate level discussion course.
- Ecology and Evolution (Spring 2010), sophomore level course.
- Quantitative Genetics (Spring 2011), graduate level course.

Teaching Assistant, University of Sheffield, Department of Animal and Plant Sciences, Fall 2004-Spring 2005.

- Wildlife Forensics (spring 2004 and 2005) sophomore level class.

- Wildlife Ecology (spring 2004) junior level class.
- Introductory Statistics (spring 2004) sophomore level class.

Student Research Supervision

Graduate Thesis Directed

Mikay Reuter, PhD, 2024-present "Using genomic techniques to study population genetics of high Arctic fishes".

Lucia Várgas, PhD, 2024-present "Using morphological and genetic techniques to determine the taxonomic and evolutionary relationships between different *Elaphoglosum*".

Maverick Tamayo, PhD, 2023-present "Using taxonomic and genomic techniques to investigate patterns of diversity in Malesian blueberries:

Bridey Brown, MS, 2022-2024 "Using methylation data to determine the effects of diet on gene expression"

Natasha Howe, MS 2021-2023, "Genomic evidence for domestication selection in three hatchery populations of Chinook salmon, Oncorhynchus tshawytscha"

Evan Barfus, MS, 2019-2022, "Are resident populations of rainbow trout producing anadromous migrants that successfully return to spawn?"

Katie Clare, MS, 2019-2021, "Comparative genomics of rainbow trout (*Oncorhynchus mykiss*): are genes associated with migration conserved among populations?"

Abbey Johnson, MS, 2017-2019, "Connecting Developmental Thyroid Disruption to Impaired Reproductive Success in Fathead Minnows". Co-advised with Marlo Jeffries.

Spencer Weinstein, MS, 2016-2018, "Should I stay, or should I go? Using NGS approaches to determine the genetic basis of migration in rainbow trout".

Andria Beal, MS, 2014-2016, "Using RNA-seq to study the sex-role reverse gulf pipefish: Are patterns of sex-bias in gene expression different when we are dealing with Mr. Mom".

Service on Graduate Thesis Committees

Kate Davis, MS 2024-present, Advisor Tory Bennett

Aeron Pennington, PhD 2024-present. Advisor Shauna McGillivray.

Jamison Speed, MS 2024-present. Advisor Mikaela Stewart

Chrissy Baker, MS 2023-2024. Advisor Mikaela Stewart

Alex Caron, MS 2023-2024. Advisor Shauna McGillivray

Ulysses Oles, MS 2022-2024. Advisor Dean Williams

Rashidat Jimoh, MS 2022-2023. Advisor Marlo Jeffries

Ellen Hall, MS 2018-2020. Advisor: Tory Bennett.

Peter Bruns, MS 2016-2018. Advisor: Marlo Jeffries

Honors Theses Directed

Lynsey Malin, 2017-2018 “Investigating patterns of sex-bias in gene expression of sdY in rainbow trout”.

Tu Huynh, 2016-2017, “Determine phytoene desaturase gene copy number in *Hydrilla verticillata*”. Co-advised with Dean Williams.

Christy Smith, 2015-2017, “Mapping genes involved in phototransduction in rainbow trout (*Oncorhynchus mykiss*).”

Sam Showalter, 2015-2017, “Using RNA-seq data from two years of sampling to determine levels of sex-bias in gene expression in brook trout (*Salvelinus fontinalis*).”

Ben Showalter, 2015-2017, “Using SNP data to uncover the genetic basis of migration between migratory steelhead, and resident rainbow trout (*Oncorhynchus mykiss*).”

Service on Honors Theses Committees

Tate Truly, 2018-2019 “Inducing Oxidative Stress Using Biotin-Receptor Targeted Organometallic Compounds on Cancer”. Advisor: Giri Akkaraju

Mallory Seeman, 2017-2018, “Investigating the cause of reproductive impairment following thyroid disruption in the fathead minnow (*Pimephales promelas*)”. Advisor: Marlo Jeffries.

Gunnar Nystrom, 2016-2017, “Cause for concern: Biological implications of heavy metal contamination in Kazakhstan's Syr Darya river”. Advisor: Marlo Jeffries.

Eric Reid, 2016-2017, “Testing the specificity and cytotoxicity of biotin-ferrocene compounds on cancer cells”. Advisor: Giri Akkaraju.

Kaitlyn Upton, 2016-2017, “DNA barcoding insect species for Texas horned lizard diet analysis”. Advisor: Dean Williams.

Elise Path, 2015-2016, “Identifying sensitive indicators of thyroid disruption in fathead minnows after exposure to thyroxine and propylthiouracil”. Advisor: Marlo Jeffries.

Alexis Medders, 2015-2016, “Males, masculinity, and immunity: A test of the immunocompetence handicap hypothesis in fathead minnows”. Advisor: Marlo Jeffries.

Kristin Scoggin, 2015-2016, “Historic genetic variance of the Texas horned lizard”. Advisor: Dean Williams.

Rachel Alenius, 2015-2016, "Diet analysis of Texas horned lizards in urban environments". Advisor: Dean Williams.

Elli Hodge, 2015-2016, "The effects of hepatitis C viral protein, NS5A, on transcription factor NF-KB". Advisor: Giri Akkaraju.

Supervised Undergraduate Students, Texas Christian University (2015 to present).
Christy Smith
Phillip Crain
Courtney Bell
Jessie Yates
Ben Showalter
Sam Showalter
Lauren Burgess
Lauren Tooman
Gabby Nguyen
John-Paul DuBois
Jay Bumgarner
Lynsey Malin
Andrew Fletcher
Anna-Claire Pilkington
Danielle Wood
Annu Krishnan
Shriya Sachdeva
Bridey Brown
Asher Smith
Nick Boehly
Emmerson Jorkson
Madline Clark

RESEARCH AND CREATIVE ACTIVITIES

39 Refereed Publications (* = TCU graduate student authors, ** = TCU undergraduate student authors, † = Co first authorship)

Campbell MA, **Hale MC**, Balachandran N, Chen W-J, Becker JA (2025). The influence of aquaculture translocations and escapees on the genetics of wild stocks of *Lates calcarifer* in Taiwan and Sri Lanka. Conservation Genetics.

Weinstein SY, Dumond A, Loewen T, Reist JD, **Hale MC**, Gallagher CP, Moore J-S, Harris L, Tallman RF, Martin ZA, Craig PM, Swanson HK (2025) Identification of dolly Varden (*Salvelinus malma)* in the Canadian Arctic east of the Mackenzie River. Environmental Biology of Fishes.

Barfuss EJ*, Brown BE*, Sachdeva S**, Smith AB**; Thrower FP, Waters CD, Nichols KM, **Hale MC** (2024). Using Genetic Data to Determine Origin for Out-Migrating Smolt and Returning Adult Steelhead Trout (Oncorhynchus mykiss) in a Southeast Alaska Drainage. Ecology and Evolution. 14: DOI10.1002/ece3.70472

Weinstein SY, Gallagher CP, **Hale MC**, Loewen TN, Reist JD, Swanson HK (2024) Gill raker and pyloric caeca counts different between Arctic char (*Salvelinus alpinus*) and dolly varden (*S. malma*) populations across their range. J Fish Biology https://doi.org/10.1111/jfb.15785

Campbell MA and **Hale MC** (2024) Genomic structural variation in Barramundi Perch *Lates calcarifer* and potential roles in speciation and adaptation. G3 – Genes Genomes Genetics https://doi.org/10.1093/g3journal/jkae141

Hale MC, Pearse DE, Campbell MA (2024) Characterization and distribution of a 14-MB chromosomal inversion in native populations of rainbow trout (*Oncorhynchus mykiss*). G3- Genes Genomes Genetics.

Howe NS*, **Hale MC,** Waters CD, Schaal SM, Shedd KR, Laron WA (2024) Genomic evidence for domestication selection in three hatchery populations of Chinook salmon, *Oncorhynchus tshawytscha*. *Evolutionary Applications*. 17: DOI10.1111/eva.13656

Weinstein SY, Gallagher CP, **Hale MC,** Loewen TN, Power M, Reist JD, Swanson HK (2024) An updated review of the post-glacial history, ecology, and diversity of Arctic char (*Salvelinus alpinus*) and Dolly Varden (*S. malma*). *Environmental Biology of Fishes*. 107: 121-154.

Clare CA*, Nichols KM, Thrower FP, Berntson EA, **Hale MC** (2023) Comparative genomics of rainbow trout (Oncorhynchus mykiss): is the genetic architecture of migration behavior conserved among populations? *Ecology and Evolution*. 13: DOI10.1002/ece3.10241

Campbell MA†, **Hale MC**†, Jalbert CS, Dunker K, Sepulveda AJ, López JA, Falke JA, Westley PA (2023) Genomics reveal the origins and current structure of a genetically depauperate freshwater species in its introduced Alaskan range. *Evolutionary Applications*. 16: 1119-1134.

Hale MC, Campbell MA, McKinney GJ (2021) A candidate chromosome inversion in Arctic charr (*Salvelinus alpinus*) identified by population genetic analysis techniques. *G3: Genes, Genomes, Genetics* 11 DOI10.1093/g3journal/jkab267

Hale MC, McLaughlin R, Wilson C, Mackereth R, Nichols KM (2021) Differential gene expression associated with behavioral variation in ecotypes of Lake Superior brook trout (*Salvelinus fontinalis*). *Comparative Biochemistry and Physiology Part D: Genomics and Proteomics*. 40: DOI10.1016/j.cbd.2021.100884

Blumstein DM, Campbell MA, **Hale MC**, Sutherland BJG, McKinney GJ, Stott W, Larson WA. (2020) Comparative genomic analysis and a novel linkage map for cisco (*Coregonus artedi*) provide insights into chromosomal evolution and rediploidization across salmonids. *G3: Genes, Genomes, Genetics* 10: 2863-2878.

Weinstein SY*, Thrower FP, Nichols KM, **Hale MC**. (2019) A large-scale chromosomal inversion is not associated with life history development in rainbow trout from Southeast Alaska. *PLoS One*. 14 (9).

Campbell MA†, **Hale MC**†, McKinney GJ, Nichols KM, Pearse DE. (2019) Long-term conservation of ohnologs through partial tetrasomy following whole-genome duplication in Salmonidae. *G3: Genes, Genomes, Genetics* 9: 2017-2028.

Claunch KC*, Bush M**, Evans CR**, Malmquist JA*, **Hale MC**, McGillivray SM. (2018) Transcriptional profiling of the *clpX* mutant in *Bacillus anthracis* reveals regulatory connection with the *lrgAB* operon. *Microbiology* 164: 659-669.

Hale MC, McKinney GJ, Thrower FP, Nichols KM. (2018) Evidence of sex-bias in gene expression in the brain transcriptome of two populations of rainbow trout (*Oncorhynchus mykiss*) with divergent life histories. *PLoS One*. https://doi.org/10.1371/journal.pone.0193009.

Beal AP*, Martin FD, **Hale MC**. (2018) Using RNA-seq to determine patterns of sex-bias in gene expression in the brain of the sex-role reversed Gulf Pipefish (*Syngnathus scovelli*). *Marine Genomics* 37: 120-127.

Hale MC, McKinney GJ, Bell C**, Nichols KM. (2017) Using linkage maps as a tool to determine patterns of chromosome synteny in the genus *Salvelinus*. *G3: Genes, Genomes, Genetics* 6. 3821-3830.

Hale MC, McKinney GJ, Thrower FP, Nichols KM. (2016) RNA-seq reveals differential gene expression in the brains of juvenile resident and migratory smolt rainbow trout (*Oncorhynchus mykiss*). *Comparative Biochemistry and Physiology Part D: Genomics and Proteomics* 20: 136-150.

McKinney GJ, **Hale MC**, Goetz G, Gribskov M, Thrower FP, Nichols KM. (2015) Ontogenetic changes in gene expression in progeny from migratory and resident *Oncorhynchus mykiss*. *Molecular Ecology* 24: 1792-1809.

Hale MC, Colletti J, Gahr SA, Scardina J, Harmon M, Duge M, Phillips RB, Thorgaard GH, Rexroad CE, Nichols KM. (2014) Mapping and expression of candidate genes underlying a major development rate quantitative locus in rainbow trout (*Oncorhynchus mykiss*). *Journal of Heredity* **105**: 506-520.

Doyle JM, Siegmund G, Ruhl JD, Eo SH, **Hale MC**, Marra NJ, Waser PM, DeWoody JA. (2013) Microsatellite analyses across three diverse vertebrate transcriptomes (*Acipenser fulvescens*, *Ambystoma tigrinum*, and *Dipodomys spectabilis*). *Genome* **56**: 407-414.

Hale MC, Thrower FP, Berntson EA, Miller MR, Nichols KM (2013) Genome-wide association of migration and residency in a non-model fish species, *Oncorhynchus mykiss*. *G3: Genes, Genomes, Genetics* **3**: 1273-1285.

Marra NJ, Eo SH, **Hale MC,** Waser PM, DeWoody JA (2012) A priori and a posteriori approaches for finding genes of evolutionary interest in non-model species: osmogregulatory genes in the kidney transcriptome of the desert rodent *Dipodomys spectabilis* (banner-tailed kangaroo rat). *Comparative Biochemistry and Physiology: Part D Genomics and Proteomics,* **7**: 328-339.

Hecht BC, Thrower, FP, **Hale MC,** Miller MR, Nichols KM (2012) The genetic architecture of migration related traits in rainbow and steelhead trout (*Oncorhynchus mykiss*) *G3: Genes, Genomes, Genetics* **2**: 1113-1127.

Eo SH, Doyle JM, **Hale MC,** Marra NJ, Ruhl JD, DeWoody JA (2012) Comparative transcriptomics and gene expression in larval tiger salamanders (*Ambystoma tigrinum*) gill and lung tissues as revealed by pyrosequencing. *Gene* **492**: 329-338.

Billing AM, Lee AM, Skjelseth S, Borg ÅA, **Hale MC**, Slate J, Pärn H, Ringsby TH, Sæther B-E, Jensen H (2012) Evidence of inbreeding depression but not inbreeding avoidance in a natural house sparrow population. *Molecular Ecology* **21**: 1487-1499.

Watt PJ, Skinner A, **Hale MC**, Nakagawa S, Burke TR (2011) Small subordinate male advantage in the zebrafish. *Ethology* **117**: 1003-1008.

Hale MC, Xu P, Scardina J, Wheeler PA, Thorgaard GH, Nichols KM (2011) Differential gene expression in male and female rainbow trout embryos prior to the onset of gross morphological differentiation of the gonads. *BMC Genomics* **12**: 404.

Hale MC, Jackson JR, DeWoody JA (2010) Discovery and evaluation of candidate sex-determining genes and xenobiotics in the gonads of lake sturgeon (*Acipenser fulvescens*). *Genetica* **138**: 745-756.

Hale MC, McCormick CR, Jackson JR, DeWoody JA (2009) Next-generation pyrosequencing of gonad transcriptomes in the polyploid lake sturgeon (*Acipenser fulvescens*): the relative merits of normalization and rarefaction in gene discover. *BMC Genomics* **10**: 203. Highly accessed (>6000x).

Slate J, Gratten J, Beraldi D, Stapley J, **Hale MC**, Pemberton J (2009) Gene mapping in the wild with SNPs: guidelines and future directions. *Genetica* **136**: 97-107.

Hale MC, Jensen H, Birkhead TR, Burke TA, Slate J (2008) A comparison of synteny and gene order on the homologue of chicken chromosome 7 between two passerine species and between passerines and chicken. *Cytogenetics and Genome Research* **121:** 120-129.

Slate J, **Hale MC**, Birkhead TR (2007) Simple sequence repeats in zebra finch (*Taeniopygia guttata*) expressed sequence tags: a new resource for evolutionary genetic studies of passerines. *BMC Genomics* **8**: 52.

Hinten GN, **Hale MC**, Gratten J, Mossman JA, Lowder B, Mann MK, Slate J (2007) SNP SCALE: SNP scoring by colour and length exclusion. *Molecular Ecology Notes* **7**: 377-388.

Dawson DA, Burke T, Hansson B, Pandhal J, **Hale MC**, Hinten GN, Slate J (2006) A predicted microsatellite map of the passerine genome based on chicken-passerine sequence similarity. *Molecular Ecology* **15**: 1299-1320.

Book Chapters

Hale MC (2024) The genetics and epigenetics of life history and reproduction: Fish**.** In M. K. Skinner (Ed.), *Encyclopedia of Reproduction*. vol. 6, 3rd edition.

Hale MC (2018) The Genetics and Epigenetics of Life History and Reproduction: Fish**.** In M. K. Skinner (Ed.), *Encyclopedia of Reproduction*. vol. 6, pp. 728–735. Academic Press: Elsevier. http://dx.doi.org/10.1016/B978-0-12-809633-8.20656-0

DeWoody JA, **Hale MC**, Avise JC (2010) Vertebrate sex determining genes and their potential utility in conservation, with particular emphasis on fishes. In *Molecular Approaches in Natural Resource Conservation* (DeWoody JA, Bickham JW, Michler C, Nichols KM, Rhodes OE, Weste K, eds). Cambridge University Press.

Awards

Funded External Grant Proposals

University of Waterloo. External contract for Next generation Sequencing of Arctic charr and Lake trout. PI = Heidi Swanson and **Matt Hale**, $11,000 (2019-2020).

Great Lakes Fisheries Commission. Behavioural and genetic diversity amongst ecotypes of Lake Superior brook trout. PI = **Matt Hale**, Co-PIs = Krista Nichols, Robert McLaughlin, Chris Wilson, Robert Mackereth, $53,453 (2015-2017).

The Genome Consortium for Active Teaching – NextGen Sequencing in Undergraduate Education Workshop. 2015. Masculinity and immunity: Using global gene expression data to uncover the relationship between sexual ornamentation and pathogen resistance in male fathead minnows. Funds awarded to cover travel to the workshop ($800) and next-generation sequencing costs ($1500). Marlo Jeffries and **Matt Hale**.

Funded Internal Grant proposals

TCU Research and Creative Activities Fund. 2021-2022. Using genetics to determine the effects of hatchery rearing in Chinook salmon. $4320. **Matt Hale**

TCU Research and Creative Activities Fund. 2019-2020. Who do You Think You Are? Using Large-Scale Genetic Data to Determine Origin of Migratory Rainbow Trout (Oncorhynchus mykiss). $3600. **Matt Hale**.

Science and Engineering Research Centre. 2019-2020. Genotyping SNPs in migratory rainbow trout from Sashin Creek, Alaska. $1,495. Awarded to Anna-Claire Pilkington. P.I. **Matt Hale**.

TCU Research and Creative Activities Fund. 2018-2019. What can you do with 1.6 Billion Sequences? Using Genomic Methods to Determine the Genetic Basis of Migration in Rainbow Trout (Oncorhynchus mykiss). $2800. **Matt Hale**.

Science and Engineering Research Centre. 2016-2017. Examining sex bias in gene expression in the brain tissue of brook trout. $1,411. Awarded to Sam Showalter. P.I. **Matt Hale**.

Science and Engineering Research Centre. 2016-2017. Finding polymorphisms associated with migration in the rainbow/steelhead trout genome. $1,451**.** Awarded to Ben Showalter. P. I. **Matt Hale**.

Honor's College Research Grant. 2016-2017. Mapping phototransduction genes in the rainbow trout genome. $1,000. Awarded to Christy Smith. P. I. **Matt Hale**.

Science and Engineering Research Centre. 2016-2017. Mapping phototransduction genes in rainbow trout $1498. Awarded to Christy Smith. P.I. **Matt Hale**.

Texas Christian University Junior Faculty Summer Research Program. 2016. There and back again: Using genomic methods to determine the genetic basis of migration in rainbow and steelhead trout (*Oncorhynchus mykiss*). $6000. **Matt Hale.**

TCU Research and Creative Activities Fund. 2016-2017. There and back again: Using genomic methods to determine the genetic basis of migration in rainbow and steelhead trout (*Oncorhynchus mykiss*). $3744. **Matt Hale**.

TCU Research and Creative Activities Fund. 2015-2016. The genetic basis of freshwater adaptation in gulf pipefish (*Syngnathus scovelli*) $3996. **Matt Hale**.

Texas Christian University Junior Faculty Summer Research Program. 2015. The genetic basis of freshwater adaptation in gulf pipefish. $6000. **Matt Hale**.

Student Accomplishments

Other Student Awards

Second place for "Adaptation of seahorses and pipefish: Is it in their genes?" by Andria Beal. TCU Three Minute Thesis competition, College of Science and Engineering. Fall 2015.

Second place for "Adaptation of seahorses and pipefish: Is it in their genes?" by Andria Beal. TCU Three Minute Thesis competition. Campus wide. Spring 2016

Presentations (** = TCU graduate student authors, * = TCU undergraduate student authors)

Reuter M**, Campbell M, Dunker K, **Hale MC**. 2025. "Using genomics to determine origins and dispersal patterns of invasive northern pike (*Esox lucius*) in southcentral Alaska" Society for the Study of Evolution.

Tamayo MN**, **Hale MC**, & Fritsch PW. 2025. Taxonomic revision of the tropical blueberries (*Vaccinium* L., Ericaceae) of the Philippines. Botany 2025. Palm Springs, California, USA, 2025.

Tamayo MN**, Fritsch PW & **Hale MC** 2025. Phylogenomic study of the Asian blueberries (Vaccinieae, Ericaceae). Ateneo de Manila University, Philippines, 2025 [webinar]

Weinstein SY, Gallagher CP, **Hale MC**, Loewen TN, Reist JD, Swanson HK. 2023. Identification of sympatric anadromous Arctic char (Salvelinus alpinus) and Dolly Varden (S. malma malma) in the central Canadian Arctic. 10th Charr Symposium. Nikko, Japan.

Weinstein SY, Gallagher CP, **Hale MC**, Loewen TN, Power M, Reist JD, Swanson HK. 2023. An updated review of the post-glacial history, ecology, and diversity of Arctic char (Salvelinus alpinus) and Dolly Varden (S. malma). 10th Charr Symposium. Nikko, Japan.

Weinstein SY, **Hale MC**, Loewen TN, Swanson HK. 2023. Genomics, morphometrics, and local knowledge inform char (Salvelinus spp.) conservation in the central Canadian Arctic. NoWPaS: International Workshop for PhD Students on Anadromous Salmonids. Drøbak, Norway.

Weinstein SY, **Hale MC**, Loewen TN, Swanson HK. 2023.Genomics, morphometrics, and local knowledge inform char (Salvelinus spp.) conservation in the central Canadian Arctic. Society of Canadian Aquatic Sciences. Montréal, Québec, Canada.

Clare CI**, Nichols KM, Thrower FP, Berntson EA, **Hale MC.** 2023 Comparative genomics of rainbow trout: is the genetic architecture of migratory behavior conserved among populations? Coastwide salmonid genetics meeting. Boise, ID

Howe N**, **Hale MC**, Waters C, Larson W. 2023 Genomic evidence for domestication selection in three hatchery populations of Chinook salmon, Oncorhynchus tshawytscha. Coastwide salmonid genetics meeting. Boise, ID

Hale MC, and Campbell MA. 2023 Characterization and distribution of a large chromosomal inversion in native populations of rainbow trout. Coastwide salmonid genetics meeting. Boise, ID.

Johnson A**, Bruns P**, **Hale MC**, Jeffries MK. 2019. Developmental thyroid disruption impairs reproduction: Uncovering mechanisms using a transcriptomic approach. Society of Environmental Toxicology and Chemistry 40th North America Annual Meeting, Toronto, CA.

Hale MC, McLaughlin R, Mackereth R, Wilson C, Nichols KM. 2019. Using RNA-seq to characterize gene expression and pathway enrichment associated with behavioral variation in ecotypes of Lake Superior brook trout. **American Society of Evolution**. Providence, RI.

Blumstein, D, Campbell MA, **Hale MC**, Sutherland B, McKinney G, Larson W. 2019. The first haploid map in a Coregonid improves knowledge of chromosomal evolution and rediploidization across salmonids. **Annual Conference on Great Lakes Research**. Brockport, NY.

Johnson AS**, Bruns PC**, Sellin Jeffries MK, **Hale MC**. 2019. Connecting Developmental Thyroid Disruption to Impaired Reproductive Success - **Society of Environmental Toxicology and Chemistry South-Central Regional Meeting**, Waco, TX.

Hale MC, Campbell MA, McKinney GJ, Nichols KM, Pearse DE. 2019. The road to diploidy and the fate of ohnologs: Partial tetrasomy enables conservation of duplicated genes following whole-genome duplication in Rainbow Trout (*Oncorhynchus mykiss*). **Plant and Animal Genome Conference,** San Diego, California.

Johnson AS**, Bruns PC**, Sellin Jeffries MK, **Hale MC**. 2018. Connecting Developmental Thyroid Disruption to Impaired Reproductive Success - **Society of Environmental Toxicology and Chemistry North America** 39th Annual Meeting, Sacramento, CA

Hale MC, Campbell MA, McKinney GJ, Nichols KM, Pearse DE. 2018. The road to diploidy and the fate of ohnologs: Partial tetrasomy enables conservation of duplicated genes following whole-genome duplication in Rainbow Trout (*Oncorhynchus mykiss*). **Coastwide Salmon Genetics Meeting**, Mukilteo, Washington.

Weinstein SY**, **Hale MC**, Thrower FP, Nichols KM. 2018. Should I stay or should I go? Analysing the genetic basis of migration-related traits in rainbow trout (*Oncorhynchus mykiss*). **Coastwide Salmonid Genetics Meeting AFS**, Mukilteo, Washington.

Campbell MA, **Hale MC**, McKinney GJ, Nichols KM, Pearse DE. 2018. The road to diploidy and the fate of ohnologs: Partial tetrasomy enables conservation of duplicated genes following whole-genome duplication in Rainbow Trout (*Oncorhynchus mykiss*). **Western Division AFS**, Juneau, Alaska.

Weinstein SY**, **Hale MC**, Thrower FP, Nichols KM. 2018. Should I stay or should I go? Analysing the genetic basis of migration-related traits in rainbow trout (*Oncorhynchus mykiss*). **Texas Chapter AFS**, Texas.

Weinstein SY**, **Hale MC**, Thrower FP, Nichols KM. 2017. Should I stay or should I go? Analysing the genetic basis of migration-related traits in rainbow trout (*Oncorhynchus mykiss*). **American Society of Evolution**, Portland, Oregon.

Smith C*, Bell C*, **Hale MC**. 2017. Determining the genetic inheritance of phototransduction genes and their influence on migration using linkage mapping. **American Society of Evolution**, Portland, Oregon.

Smith C*, Bell C*, **Hale MC**. 2016. Determining the genetic inheritance of phototransduction genes and their influence on migration using linkage mapping. National Collegiate Honors Council Conference, Seattle, WA.

Beal AP**, Martin D, **Hale MC**. 2016. Using RNA-seq to study the sex-role reverse gulf pipefish: Are patterns of sex-bias in gene expression different when we are dealing with Mr. Mom? **American Society of Evolution**, Austin, Texas.

Smith C*, Bell C*, **Hale MC**. 2016. Mapping phototransduction genes in the *Oncorhynchus mykiss* genome. **American Society of Evolution**, Austin, Texas.

Medders AM*, **Hale MC**, Jeffries MK. 2016. Male fathead minnow phenotypes: Implications for toxicity testing. **South Central Society of Environmental Toxicology and Chemistry Meeting**, Fort Worth, TX.

Hale MC, McKinney GJ, Thrower FP, Nichols KM. 2016. Changes in sex-bias in gene expression in migrant and resident *Oncorhynchus mykiss* during the first two years of development. **Plant and Animal Genome Conference**, San Diego, California.

Hale MC, Thrower FP, Bernston E, Miller MR, Nichols KM. 2013. Using population genomic and association analysis techniques to determine the genetic basis for migration in rainbow and steelhead trout (*Oncorhynchus mykiss*). **American Society of Evolution**, Snowbird, Utah.

Hale MC, Hecht BC, Bernston E, Thrower FP, Nichols KM. 2012. Dissecting the genetic basis for migration in rainbow and steelhead trout (*Oncorhynchus mykiss*). **Plant and Animal Genome**, San Diego, California.

Hale MC, Hecht BC, Thrower FP, Bernston E, Miller MR, Nichols KM. 2011. Association genetics of migration and residency in Rainbow and Steelhead trout (*Oncorhynchus mykiss*). **American Fisheries Society**, Seattle, Washington.

Hale MC, Xu P, McIntyre L, Scardina J, Wheeler P, Thorgaard G, Nichols KM. 2011. Transcriptome profiling of sex and development rate during embryogenesis in rainbow trout (*Oncorhynchus mykiss*). **Plant and Animal Genome**, San Diego, California.

Hale MC, Colletti J, Scardina J, Thrower F, Nichols KM. 2010. Candidate gene discovery and association of embryonic development rate in rainbow trout (*Oncorhynchus mykiss*). **American Society of Evolution**, Portland, Oregon.

Hale MC, Xu P, McIntyre L, Scardina J, Wheeler P, Thorgaard G, Nichols KM. 2010. Transcriptome profiling of sex and development rate during embryogenesis in rainbow trout (*Oncorhynchus mykiss*), **World Aquaculture Society**, San Diego, California.

Hale MC, Jackson R, DeWoody JA. 2009. Transcriptome based discovery and evaluation of candidate sex determining genes and reproductive proteins of lake sturgeon. **America Society of Evolution**, Moscow, Idaho.

Hale MC, Jackson R, DeWoody JA. 2009. Transcriptome based discovery and evaluation of candidate sex determining genes and reproductive proteins of lake sturgeon. **Society for Molecular Biology and Evolution**, Iowa City, Iowa.

Invited Seminars

Hale MC, McKinney G, Nichols KM. 2016. Should I stay or should I go? Using genetic information to determine the genetic basis of migration in rainbow trout. University of Texas at Tyler.

Hale MC, Thrower F, Nichols KM. 2013. Using genome wide sequence data to determine the genetic basis of migration in rainbow and steelhead trout. Texas Christian University.

Hale MC, Thrower F, Berntson E, Miller MR, Nichols KM. 2013. Genome sequencing of rainbow trout using RAD-tag methodology. Purdue University.

Hale MC, Hecht BC, Thrower F, Bernston E, Miller MR, Nichols KM. 2011. Dissecting the genetic basis for migration in rainbow and steelhead trout. Purdue University.

Hale MC, Lucas J, Jackson RJ, DeWoody JA. 2009. Using and abusing the transcriptome: what you can do with 473,577 sequences? Purdue University.

Hale MC, Jensen H, Birkhead TR, Burke TA, Slate J. 2007. Synteny and gene order on the homologue of chicken chromosome 7 between two passerine species and between passerines and chicken. Purdue University.

Hale MC, Jensen H, Birkhead TR, Burke TA, Slate J. 2006. Constructing Genetic Linkage Maps for Passerine Birds. University of Sheffield.

Hale MC, Slate J. 2005. Methods in Determining Levels of Genetic Polymorphism in Non-Model Species. University of Sheffield.

SERVICE

Departmental Service

Member, Mondays at TCU, 2015-2018
Minute taker for Biology department faculty meetings. 2016-2021
Member, Committee on Graduate Studies. 2016-2021
Member, Biology department advisory committee, 2021-2023 and 2025-present

Member, Biology department advancement committee, 2020-2022
Chair, Committee on Graduate Studies. 2022-current
Member, ad hoc committee for tenure track search (four times since 2022)
Chair, ad hoc committee for tenure track search (two times since 2022)

College Service

Member, High power Computer Committee, 2015-current.
Member, Health Professions Advising Committee, 2015-2022.
Judge, College of Science and Engineering Honors symposium, April 2016.
Member, CSE undergraduate curriculum 2019-2022

Campus Service

Judge, Boller Honors finalists. April 2016.
Member, University Graduate Council 2023-current

Professional Service

Member of the Graduate Committee, Department of Animal and Plant Sciences, University of Sheffield, Oct 2004-Oct 2005.

Manuscript Referee

BMC Genomics, *BMC Genetics*, *Heredity*, *PLoS One*, *Sexual Development*, *Molecular Ecology*, *Molecular Ecology Resources*, *Genetics*, *Journal of Applied Ichthyology*, *G3: Genes, Genomes and Genetics*, *Evolutionary Applications*, *Conservation Genetics*, *Comparative Biochemistry and Physiology, Part D- Genomics*, *Aquatic Biology.*

Professional Affiliations

American Fisheries Society
Genetics Society of America
Society of Ecology and Evolution
American Ornithologist Union