

## TIMOTHY HARDING WEBSTER

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### CURRENT POSITION

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2015-Present **Postdoctoral Research Associate**, School of Life Sciences, Arizona State University, Tempe, AZ, USA

### PREVIOUS POSITIONS

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2013-2014 **Adjunct Assistant Professor**, Department of Anthropology, Southern Connecticut State University, New Haven, CT, USA

2011-2014 **Teaching Fellow**, Department of Anthropology, Yale University, New Haven, CT, USA

### EDUCATION

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2015 **Ph.D., with distinction**, Anthropology, Yale University, New Haven, CT, USA  
*Dissertation Research: "Genomics of a Primate Radiation: Speciation and Diversification in the Macaques."*

2012 **M.Phil.**, Anthropology, Yale University, New Haven, CT, USA

2008 **Junior Visiting Fellow**, Leverhulme Centre for Human Evolutionary Studies, Department of Biological Anthropology, University of Cambridge, UK

2008 **B.A.**, Anthropology and Zoology, Miami University, Oxford, OH, USA

### PREPRINTS

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\*Authors contributed equally

15. **Webster TH**; Couse M; Grande BM; Karlins E; Phung TN; Richmond PA; Whitford W; Wilson Sayres MA. Identifying, understanding, and correcting technical biases on the sex chromosomes in next-generation sequencing data. *bioRxiv* 346940.
14. **Webster TH\***; Dolby GA\*; Wilson Sayres MA; Kusumi K. 2018. An improved draft genome for the Mojave Desert Tortoise, *Gopherus agassizii*: version 1.1. *PeerJ Preprints* 5: e3266v3.

## PEER-REVIEWED PUBLICATIONS

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#Student supervised

13. Winters S; Kamilar JM; **Webster TH**; Bradley BJ; Higham JP. *In revision*. Primate camouflage in the eyes of felids, raptors, and conspecifics.
12. Grüning B; *et al.* (164 total authors). 2018. Bioconda: a sustainable and comprehensive software distribution for the life sciences. *Nature Methods* 15: 475-476.
11. Rupp S<sup>#</sup>; **Webster TH**; Olney KC; Hutchins ED; Kusumi K; Wilson Sayres MA. 2017. Nearly complete dosage compensation in *Anolis carolinensis*, a reptile with XX/XY chromosomal sex determination. *Genome Biology and Evolution* 9: 231-240.
10. **Webster TH**; Wilson Sayres MA. 2016. Genomic signals of sex-biased demography: progress and prospects. *Current Opinions in Genetics and Development* 41: 62-71.
9. Baden AL; **Webster TH**; Kamilar JK. 2016. Resource seasonality and reproduction predict fission-fusion dynamics in a Malagasy strepsirrhine, *Varecia variegata*. *American Journal of Primatology* 78: 256-279.
8. Hsiang AY; Field DJ; **Webster TH**; Behlke ADB; Davis MB; Racicot RA; Gauthier JA. 2015. The origin of snakes: revealing the ecology, behavior, and evolutionary history of ancestral snakes using genomics, phenomics, and the fossil record. *BMC Evolutionary Biology* 15:87.
7. **Webster TH**; McGrew WC; Marchant LF; Payne CLR; Hunt KD. 2014. Selective insectivory at Toro-Semliki, Uganda: Comparative analyses suggest no 'savanna' chimpanzee pattern. *Journal of Human Evolution* 71: 20-27.
6. Anestis SF; **Webster TH**; Kamilar JK; Fontenot MB; Watts DP; Bradley BJ. 2014. *AVPR1a* variation in chimpanzees (*Pan troglodytes*): population differences and association with behavioral style. *International Journal of Primatology* 35(1): 305-324.
5. McGrew WC; Marchant LF; Payne CLR; **Webster TH**; Hunt KD. 2013. Well digging by Semliki chimpanzees: new data on laterality and hydrology. *Pan Africa News* 20(1): 5-8.
4. McIntosh AM; Bennett C; Dickson D; Anestis SF; Watts DP; **Webster TH**; Fontenot MB; Bradley BJ. 2012. The apolipoprotein E (*APOE*) gene appears functionally monomorphic in chimpanzees (*Pan troglodytes*). *PLoS ONE* 7(10): e47760.

3. McGrew WC; Marchant LF; Payne CLR; **Webster TH**; Hunt KD. 2010. Chimpanzees at Semliki ignore oil palms. *Pan Africa News* 17(2): 19-21.
2. **Webster TH**; Hodson PR; Hunt KD. 2009. Grooming hand-clasp by chimpanzees of the Mugiri community, Toro-Semliki Wildlife Reserve, Uganda. *Pan Africa News* 16 (1): 5-7.
1. Payne CLR; **Webster TH**; Hunt KD. 2008. Coprophagy by the semi-habituated chimpanzees of Semliki, Uganda. *Pan Africa News* 15 (2): 29-32.

#### **OTHER ARTICLES AND NOTES**

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Olney KC; Narang P; Taravella AM; **Webster TH**; Wilson Sayres MA. EvSex16: Evolutionary genomics of sex. *Journal of Heredity* 108: 707-708.

#### **SOFTWARE**

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*XYalign*. (Lead Developer). Inferring sex chromosome complement, identifying sex chromosomes, and correcting for technical biases in NGS data.  
<https://github.com/WilsonSayresLab/XYalign/>.

#### **RESEARCH GRANTS**

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| 2018 | <b>Leakey Foundation</b> (\$24,984; co-I). “What drives microbiome development and maintenance in a fission-fusion primate?”   |
| 2018 | <b>PSC-CUNY Research Grant</b> (\$11,080; external collaborator). “What predicts gut microbial communities in a lemur with fission-fusion social dynamics?”  |
| 2017 | <b>Leakey Foundation</b> (\$24,969; co-I). “Understanding the evolutionary genetic origins of hominin sexual dimorphism.”  |
| 2017 | <b>Desert Tortoise Council</b> (\$11,970; co-PI) “Determining the geographical and physiological range limits of <i>Gopherus agassizii</i> .”  |
| 2017 | <b>Heritage Fund Grant, Arizona Game and Fish Department</b> (\$33,776; co-PI). “Characterizing the Sonoran Desert tortoise through genomic analyses of hybrids and speciation.”                                   |
| 2016 | <b>Postdoctoral Research in the Life Sciences Grant, Arizona State University</b> (\$7,496; PI). “Deciphering Ecological Drivers of Speciation and Local Adaptation in the Desert Tortoise Complex.”               |
| 2015 | <b>Doctoral Dissertation Research Improvement Grant, National Science Foundation</b> (\$17,892; co-PI). “Doctoral Dissertation Research: Genomics of Speciation and Diversification in primates.” NSF BCS-1455818. |

- 2014 **James F. Nacey Fellowship, The Nacey Maggioncalda Foundation** (\$3,450; PI). “Genomics of a Primate Radiation: Speciation and Diversification in the Macaques.”
- 2014 **Doctoral Discovery Grant, Yale Institute for Biospheric Studies** (\$10,000; PI). “Genomics of a Primate Radiation: Speciation and Diversification in the Macaques.”
- 2013 **Dissertation Improvement Grant, Yale Institute for Biospheric Studies** (\$5,000; PI). “Genomics of a Primate Radiation: Speciation and Diversification in the Macaques.”
- 2010 **Williams Fund, Yale University** (\$3,000; PI). “Nutritional ecology of Ngogo chimpanzees.”
- 2008 **Rebecca Jeanne Andrew Memorial Award, Miami University** (\$5,150; PI). “Well-digging and insectivory of chimpanzees of Semliki, Uganda.”
- 2007 **Rebecca Jeanne Andrew Memorial Award, Miami University** (\$2,000; PI). “Cortical and cancellous bone ratios in human and ape calcanei.”

#### **OTHER AWARDS AND FUNDING**

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- 2015 **Distinguished Achievement Award, Provost’s Online Education Committee, Yale University** (\$500). “Science on Demand: Connecting Students and Yale Researchers through Online Videos and Activities.” With the Yale Science Diplomats Education Outreach Committee.
- 2014-2015 **University Dissertation Fellowship, Yale University.**
- 2014 **Online Education Innovation Grant, Yale University** (\$500). “Science on Demand: Connecting Students and Yale Researchers through Online Videos and Activities.” With the Yale Science Diplomats Education Outreach Committee.
- 2014 **Best Student Poster Award, North Eastern Primate Ecology, Evolution, and Biology Group.** For poster presentation titled “Protein evolution in *Propithecus verreauxi* detected using exome sequencing and *de novo* assembly.”
- 2014 **Outstanding Student Presentation Award, American Association of Anthropological Genetics.** For podium presentation at the annual meeting of the American Association of Physical Anthropologists titled “Gene loss and protein evolution in *Propithecus verreauxi* detected using exome sequencing and *de novo* assembly.”
- 2012-2013 **Dean’s Fund, Yale University** (\$1,000). Funding for “Biological Anthropology Colloquium Series.”

2008            **Departmental Honors, Department of Anthropology, Miami University.**

2007            **Research Excellence in Anthropology, Miami University.**

**CONFERENCE PRESENTATIONS (PUBLISHED ABSTRACTS OR MATERIALS)**

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**Webster TH;** Bradley BJ. 2018. Patterns of genomic diversity on the X chromosome and autosomes reveal different demographic histories across macaque lineages. *American Journal of Physical Anthropology* 165 (S66): 297-298. Podium.

Guevara EE; **Webster TH;** Ranaivonasy J; Ratsirarson J; Lawler RR; Bradley BJ; Harris RA; Liu Y; Murali SC; Raveendran M; Hughes DST; Muzny DM; Yoder A; Worley KC; Rogers J. 2018. Evolutionary genomics of Verreaux's sifaka (*Propithecus verreauxi*). *American Journal of Physical Anthropology* 165 (S66): 108. Podium.

Barrett MT; Lenkiewicz E; Malasi S; **Webster T;** Wilson Sayres MA; McCullough AE; Anderson KS; Pockaj BA. 2017. Clonal heterogeneity in breast cancer and its impact on clinical biomarkers. *Cancer Research* 77 (4 Suppl): Abstract P1-05-12. Poster.

**Webster, TH;** Phung, T; Couse M; Grande B; Karlins E; Richmond P; Whitford W; Wilson Sayres MA. 2016. XYalign: inferring and correcting for sex chromosome ploidy in next-generation sequencing data. *Evolutionary Genomics of Sex*. DOI: 10.6084/m0.figshare.4292924.v1. Poster.

**Webster TH;** Bradley BJ. 2015. Exomic copy number variation in the macaques. *American Journal of Physical Anthropology* 156(S60): 322. Poster.

**Webster TH;** Lawler RR; Bradley BJ. 2014. Gene loss and protein evolution in *Propithecus verreauxi* detected using exome sequencing and *de novo* assembly. *American Journal of Physical Anthropology* 153 (S58): 269. *Winner of the AAAG Outstanding Student Presentation Award*. Podium.

Winters S; Kamilar JM; **Webster TH;** Bradley BJ; Higham JP. 2014. Primate camouflage as seen by felids, raptors, and conspecifics. *American Journal of Physical Anthropology* 153 (S58): 275. *Winner of the AAPA Sherwood Washburn Prize for Outstanding Student Presentation*. Podium.

Bradley BJ; McIntosh A; Bennett C; Anestis SF; Watts DP; **Webster TH;** Fontenot B. 2012. The APOE gene appears functionally monomorphic in chimpanzees (*Pan troglodytes*). *American Journal of Physical Anthropology* 147 (S54): 105. Poster.

Watts DP; **Webster TH.** 2012. Associations between dominance rank, grooming network strength, and centrality among male chimpanzees at Ngogo. *American Journal of Physical Anthropology* 147 (S54): 298. Podium.

**Webster TH**; McGrew WC; Marchant LF; Payne CLR; Hunt KD. 2012. ‘The other faunivory’ at Semliki, Uganda: is there evidence for a ‘savanna chimpanzee’ pattern of insectivory. *American Journal of Physical Anthropology* 147 (S54): 299. Podium.

Marchant LF; **Webster TH**; McGrew WC; Payne CLR; Hunt KD. 2010. Chimpanzee insectivory detected: resource availability, monitoring, and consumption. *American Journal of Physical Anthropology* 141(S50): 162-163. Poster.

Marchant LF; McGrew WC; Payne CLR; **Webster TH**; Hunt KD. 2009. Well-digging by Semliki chimpanzees: new data. *American Journal of Physical Anthropology* 138 (S48): 183. Podium.

**Webster TH**; McGrew WC; Marchant LF; Payne CLR; Hunt KD. 2009. Semliki chimpanzees do eat insects. *American Journal of Physical Anthropology* 138 (S48): 268-269. Poster.

**Webster TH**; Suarez SA. 2008. Transfer behavior and association patterns of female spider monkeys (*Ateles belzebuth belzebuth*) in Yasuni National Park, Ecuador. *American Journal of Physical Anthropology* 135 (S46): 219. Poster.

#### **OTHER SELECTED CONFERENCE PRESENTATIONS**

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\*Presenter

#Student supervised

Ozga AT\*; **Webster TH**; Nieves-Colón MA; Fowler K; Siford R; Wilson Sayres MA; Nockerts R; Wilson ML; Gilby IC; Pusey A; Li Y; Hahn BH; Stone AC. 2018. Mitochondrial and exome diversity in *Pan troglodytes schweinfurthii* at Gombe National Park. *Society for Molecular Biology and Evolution*. Yokohama, Japan. Poster.

**Webster TH**\*; Dolby GA; DeNardo DF; Kusumi K; Wilson Sayres MA. 2018. A genomic view of adaptation and population history in desert tortoises. *Desert Tortoise Council*. Las Vegas, NV. Podium.

Dolby GA\*; **Webster TH**; DeNardo DF; Kusumi K; Wilson Sayres MA. 2018. Geologic history and genomic divergence between *Gopherus agassizii* and *G. morafkai*. *Desert Tortoise Council*. Las Vegas, NV. Podium.

**Webster TH**\*; Bradley BJ. 2017. Patterns of genomic diversity on the X chromosome and autosomes reveal different demographic histories across macaque lineages. *Southwest Association of Biological Anthropologists*. San Diego, CA. Poster

Ozga, AT\*; Nieves-Colón, MA; **Webster TH**; Wilson Sayres, MA; Nockerts, R; Wilson, ML; Gilby, IC; Pusey, A; Stone, AC. Short term reduction in *Pan troglodytes schweinfurthii* genetic diversity at Gombe National Park. *Society for Molecular Biology and Evolution*. Austin, TX. Poster.

Cotter D<sup>#</sup>\*; **Webster T**; Wilson Sayres M. 2016. Diversity across the pseudoautosomal boundary varies across human populations. *American Society for Human Genetics*. Vancouver, BC. Poster.

**Webster TH**\*; Bradley BJ. 2016. The genomic landscape of divergence across the macaque radiation. *Southwest Association of Biological Anthropologists*. Tempe, AZ. Podium.

Stone AC\*; Ozga AT; Nieves-Colón MA; Nockerts R; **Webster T**; Wilson Sayres M; Wilson M; Gilby I; Pusey A; Marean C. 2016. The preservation of DNA from bone, dentin, and calculus from Gombe National Park and Pinnacle Point in Africa. *ISBA7*. Oxford, UK. Poster.

Baden AL\*; **Webster TH**. 2016. A network analysis of social preferences in wild black-and-white ruffed lemurs. *International Primatological Society*. Chicago, IL. Poster.

**Webster TH**\*; Bradley BJ. 2016. The genomic landscape of divergence across the macaque radiation. *International Primatological Society*. Chicago, IL. Podium.

Winters S\*; Kamilar JM; **Webster TH**; Bradley BJ; Higham JP. 2015. Primate camouflage in the eyes of felids, raptors, and conspecifics. *Animal Behavior Society*. Anchorage, AK. Poster.

Baden AL\*; **Webster T**; Gerber B; Bradley BJ. 2014. Fission-fusion dynamics in wild ruffed lemurs may be driven by kinship, spatial overlap and individual social preferences. *International Primatological Society*. Hanoi, Vietnam. Podium.

Hsiang AY\*; Field DJ, Behlke ADB; Davis MB; Racicot RA; **Webster TH**; Gauthier JA. 2014. On the origin of snakes: inferring the ecology, behavior, and evolutionary history of ancestral snakes. *Evolution*. Raleigh, NC. Podium.

**Webster TH**\*; Lawler RR; Bradley BJ. 2014. Protein evolution in *Propithecus verreauxi* detected using exome sequencing and *de novo* assembly. *Nor'Eastern Primate Ecology, Evolution, and Biology Group*. Rutgers, NJ. *Winner of the Best Student Poster award*. Poster.

## **TEACHING**

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### **Instructor of Record**

2014 Spring Introduction to Biological Anthropology, Southern Connecticut State University

2013 Fall Introduction to Biological Anthropology, Southern Connecticut State University

### **Teaching Assistant**

2014 Spring Human Evolutionary Biology and Life History, Teaching Fellow, Yale University

2013 Fall Introduction to Biological Anthropology, Teaching Fellow, Yale University

- 2013 Spring Primate Molecular Ecology and Evolution, Teaching Fellow, Yale University
- 2012 Fall Molecular Anthropology, Teaching Fellow, Yale University
- 2012 Spring Human Evolution, Teaching Fellow, Yale University
- 2011 Fall Introduction to Biological Anthropology, Teaching Fellow, Yale University
- 2011 Summer Introduction to Biological Anthropology, Teaching Fellow, Yale University
- 2007 Fall Introduction to Biological Anthropology, Undergraduate Teaching Assistant, Miami University
- 2007 Spring Introduction to Biological Anthropology, Undergraduate Teaching Assistant, Miami University

#### **GUEST LECTURES**

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- Fall 2018 Computing for Research, Arizona State University, 5 guest lectures
- Summer 2018 Application of Genetics to Anthropological Research Workshop, American Association of Anthropological Genetics, *“The Basics of Read Mapping and Variant Calling”*
- Spring 2018 Molecular Genetics and Genomics, Arizona State University, *“Reproducible Genome Assembly and Variant Calling”*
- Fall 2016 Computing for Research, Arizona State University, *“Designing and Implementing a Pipeline for Reference-Based Genome Assembly”*
- Fall 2015 Decoding Sex, Arizona State University, *“DNA Sequencing and Assembly”*
- Spring 2013 Primate Molecular Ecology and Evolution, Yale University, *“Behavioral Genetics”*
- Fall 2012 Molecular Anthropology, Yale University, *“DNA Sequencing Methods and Applications”*
- Spring 2012 Introduction to Biological Anthropology, Southern Connecticut State University, *“A Brief History of Prehistory: Controversy and Contention in Human Evolution”*



## MENTORING EXPERIENCE

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### *Graduate Research Mentor*

- 2017-Present Andrew Zamora; PhD Student; University of Massachusetts, Amherst, “Population genomic approaches to understanding variation in great ape social behavior.”
- 2015-2016 Shawn Rupp; Master’s Student; Arizona State University, “Squamate sex chromosome evolution and dosage compensation”

### *Undergraduate Thesis Committee Member*

- 2017 Sarah Brotman, Arizona State University, **Thesis Reader**, Barrett Honors Undergraduate Thesis, “Standard mapping protocols misestimate sex-biased gene expression”
- 2016 Daniel Cotter, Arizona State University, **Thesis Reader**, Barrett Honors Undergraduate Thesis, “Genetic variation in the human pseudoautosomal region”

### *Undergraduate Research Mentor*

- 2018-Present Grant Denbrock, Arizona State University, “Sex chromosome evolution in the *Gila monster*”
- 2016-Present Daniel Cotter, Arizona State University, “Genetic variation in the human pseudoautosomal region”
- 2017-2018 Amanda Wolf, Arizona State University, “Designing a reproducible pipeline for great ape genome assembly”
- 2016 Kirk Flamm, Arizona State University, “Estimating and correcting contamination in next-generation sequencing data”
- 2016 Valeria Valverde-Vesling, Arizona State University, “Modeling effects of time since population bottleneck on human genetic diversity”

## INVITED TALKS (PUBLIC OUTREACH IN BOLD)

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- 2015 Arizona State University
- 2012 Yale University Department of Ecology and Evolutionary Biology; **New Haven Public Library**
- 2009 Miami University Primatology Club; **Kirtland Elementary School; Kirtland Middle School**

2007 Miami University Primatology Club; Miami University Society for the Enhancement of Anthropology

#### **INVITED OUTREACH ACTIVITIES**

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2015 Co-Op Arts and Humanities High School; Yale Peabody Museum of Natural History

2014 High School in the Community; Co-Op Arts and Humanities High School; Yale Peabody Museum of Natural History

2013 Yale Peabody Museum of Natural History; Co-Op Arts and Humanities High School; JF Kennedy Elementary School

#### **OTHER OUTREACH ACTIVITIES**

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2017 Organized and led Arizona State University workshops “Thinking about Genomic Data” and “Introduction to Reproducible Genome Assembly” aimed at introducing students, postdocs, staff, and faculty to genomic data and methods.

2016-Present Science Fair Judge for Self Development Academy (Mesa, Arizona) Middle School Science Fair.

2016 Teaching assistant for Arizona State University bioinformatics workshops aimed at introducing biology students and postdocs to programming: “Introduction to the Command Line” and “Python Bootcamp.”

2014-2015 Co-coordinator and co-producer for the Yale Science Diplomats’ “Science Shorts” – Designed, organized, and produced a video series with associated educational materials aimed at high school students and featuring Yale student researchers.

2013-2015 Member of the Evolution Outreach Group at Yale University – Designed, organized, and lead activities with the goal of introducing evolutionary and biological concepts to K-12 students.

2013 Teacher for Yale SPLASH – Taught a course on primate diversity to Connecticut middle and high school students.

2012-2015 Education Outreach Coordinator for the Yale Science Diplomats – Organized presentations in New Haven high schools given by Yale University graduate students and postdoctoral researchers.

## **PROFESSIONAL SERVICE**

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### **Peer Review**

*15 reviews total:* Proceedings of the National Academy of Sciences, Methods in Ecology and Evolution, Royal Society Open Science, Scientific Reports, Molecular Biology and Evolution, Journal of Human Evolution, Behavioral Ecology and Sociobiology, International Journal of Primatology, Primates

### **Grant Review**

*4 reviews total:* The Leakey Foundation

### **Conference Review**

*2 conferences total:* American Association of Physical Anthropologists, IEEE International Work-Conference on Bioinspired Intelligence

### **Other Service**

2016-Present Organizer of the ASU Science Postdoc seminar series

2015-Present Member of the Ethics Committee of the American Association of Anthropological Genetics.

2016-2017 Member of the Arizona State University Research Computing Training Committee

2014-2015 Member of the Constitution and By-Laws Drafting Executive Committee of the Northeast Evolutionary Primatology Group.