

Abigail Winslow Bigham
CURRICULUM VITA

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RESEARCH INTERESTS

Human population genetics, molecular evolution, evidence of natural selection in the human genome, HIV, genotype-phenotype associations, convergent evolution, high altitude adaptation.

EDUCATION

Ph.D.	Anthropology	2008	Pennsylvania State University
M.A.	Anthropology	2005	Pennsylvania State University
B.A.	Anthropology	2001	University of Arizona

PROFESSIONAL POSITIONS

07/2012-Present Assistant Professor, Department of Anthropology, The University of Michigan, Ann Arbor,
08/2008-05/2011 Senior Fellow, Department of Pediatrics, Division of Medical Genetics, The University of Washington, Seattle.
Advisor: Michael Bamshad

ACADEMIC FELLOWSHIPS AND AWARDS

2009 Training fellowship from the National Institutes of Health/National Human Genome Research Institute
2008 Outstanding Student Presentation in Human Genetics awarded by the American Association of Anthropological Genetics at the American Association of Physical Anthropologists, 77th Annual Meeting (Columbus, Ohio).
2005-2008 National Science Foundation Graduate Research Fellowship
2005 National Science Foundation East Asia and Pacific Summer Institute
2004 Honorable Mention, National Science Foundation Graduate Research Fellowship

**GRANTS
EXTRAMURAL**

2011 National Science Foundation (BCS-1132310): **Co-PI** Natural selection and genes determining higher arterial oxygen saturation in Peruvian Quechua. Total: (Direct: 200,296). sub-contract: (Direct: 42,886)(Direct & Indirect:\$66,688)

- 2006** Wenner-Gren Foundation for Anthropological Research
Dissertation Fieldwork Grant: Signatures of Natural Selection
among Populations of the Andean Altiplano and the Tibetan
Plateau. \$18,157
- 2006** National Science Foundation Doctoral Dissertation Improvement
Grant: Signatures of Natural Selection among Populations of the
Andean Altiplano and the Tibetan Plateau. \$12,000

**GRANTS
INTRAMURAL**

- 2008** Baker Fund Travel Grant, Department of Anthropology,
Pennsylvania State University
- 2006** Baker Fund Dissertation Award, Department of Anthropology,
Pennsylvania State University
- 2006** Baker Fund Travel Grant, Department of Anthropology,
Pennsylvania State University
- 2005** Baker Pre-Doctoral Award, Department of Anthropology,
Pennsylvania State University
- 2005** Baker Fund Travel Grant, Department of Anthropology,
Pennsylvania State University

PEER-REVIEWED PUBLICATIONS

- 2011** **A.W. Bigham**, K.J. Buckingham S. Husain, M.J. Emond, K.M.
Bofferding, H. Gildersleeve, A. Rutherford, N.M. Astakhova, A.A.
Perelygin, M.P. Busch, K.O. Murray, J.J. Sejvar, S. Green, J.
Kriesel, M.A. Brinton, M. Bamshad. Host Genetic Risk Factors for
West Nile Virus Infection and Disease Progression. *PLoS One*.
6:e24745.
- 2011** M.C. Hannibal, K.J. Buckingham, S.B. Ng, J.E. Ming, A.E. Beck,
M.J. McMillin, H.I. Gildersleeve, **A.W. Bigham**, H.K. Tabor, H.C.
Mefford, J. Cook, K. Yoshiura, T. Matsumoto, N. Matsumoto, N.
Miyake, H. Tonoki, K. Naritomi, T. Kaname, T. Nagai, H. Ohashi,
K. Kurosawa, J.W. Hou, T. Ohta, D. Liang, A. Sudo, C.A. Morris,
S. Banka, G.C. Black, J. Clayton-Smith, D.A. Nickerson, E.H.
Zackai, T.H. Shaikh, D. Donnai, N. Niikawa, J. Shendure, M.J.
Bamshad. Spectrum of MLL2 (ALR) mutations in 110 cases of
Kabuki syndrome. *American Journal of Medical Genetics A*.
155:1511-6.
- 2011** V.A. Browne, L. Toledo-Jaldin, R.D. Davila, L.P. Lopez, H.
Yamashiro, D. Cioffi-Ragan, C.G. Julian, M.J. Wilson, **A.W.
Bigham**, M.D. Shriver, B. Honigman, E. Vargas, R.C. Roach, L.G.
Moore. High end-arteriolar resistance limits uterine artery blood
flow and restricts fetal growth in preeclampsia and gestational
hypertension at high altitude. *American Journal of Physiology
Regulatory Integrative, and Comparative Physiology*. 300:R1221-
9.

- 2011** C. Rödelberger, P. Krawitz, X. Bauer, J. Hecht, **A.W. Bigham**, M. Bamshad, B.J. de Condor, M.R. Schweiger, P.N. Robinson. Identity-by-descent filtering of exome sequence data for disease-gene identification in autosomal recessive disorders. *Bioinformatics*. 27:829-36.
- 2011** R.D. Dávila, C.G. Julian, M.J. Wilson, V.A. Browne, C. Rodriguez, **A.W. Bigham**, M.D. Shriver, E. Vargas, L.G. Moore. Do cytokines contribute to the Andean-associated protection from reduced fetal growth at high altitude? *Reproductive Science*. 18:79-87.
- 2010** S.B. Ng*, **A.W. Bigham***, K.J. Buckingham, M.C. Hannibal, M.J. McMillin MJ, H.I. Gildersleeve, A.E. Beck, H.K. Tabor, G.M. Cooper, H.C. Mefford, C. Lee, E.H. Turner, J.D. Smith, M.J. Rieder, K. Yoshiura, N. Matsumoto, T. Ohta, N. Niikawa, D.A. Nickerson, M.J. Bamshad, J. Shendure. Exome sequencing identifies MLL2 mutations as a cause of Kabuki syndrome. *Nature Genetics*. 42: 790-3. *The authors contributed equally to this work.
- 2010** **A.W. Bigham**, M. Bauchet, D. Pinto, X. Mao, J.M. Akey, R. Mei, S. Scherer, C.G. Julian, M. Wilson, D. Lopez-Herraez, T. Brutsaert, E.J. Parra, L.G. Moore, and M.D. Shriver. Identifying signatures of natural selection in Tibetan and Andean population using dense genome scan data. *PLOS Genetics*. 6: e1001116. **Selected for Faculty of 1000.**
- 2010** R.D. Davila, C.G. Julian, M.J. Wilson, V.A. Browne, C. Rodriguez, **A.W. Bigham**, M.D. Shriver, E. Vargas, L.G. Moore. Do anti-angiogenic or angiogenic factors contribute to the protection of birth weight at high altitude afforded by Andean ancestry? *Reproductive Science*. 17:861-70.
- 2010** K.A Ross, **A.W. Bigham**, M. Edwards, A. Gozdzik, G. Suarez-Kurtz, E.J. Parra. Worldwide allele frequency distribution of four polymorphisms associated with warfarin dose requirements. *Journal of Human Genetics*. 55:582-9.
- 2010** M. Edwards, **A.W. Bigham**, J. Tan, S. Li, A. Gozdzik, K. Ross, L. Jin, E.J. Parra. Association of the OCA2 Polymorphism His615Arg with Melanin Content in East Asian Populations: Further Evidence of Convergent Evolution of Skin Pigmentation. *PLoS Genetics* 6:e1000867.
- 2010** S.B. Ng, K.J. Buckingham, C. Lee, **A.W. Bigham**, H.K. Tabor, K.M. Dent, C.D. Huff, P.T. Shannon, E.W. Jabs, D.A. Nickerson, J. Shendure, M.J. Bamshad. Exome sequencing identifies the cause of a Mendelian disorder. *Nature Genetics*. 42:30-5.
- 2009** **A.W. Bigham**, X. Mao, R. Mei, T. Brutseart, M. Wilson, C.

- Julian, E. Parra, J.M. Akey, L.G. Moore, M.D. Shriver. Identifying Positive Selection Candidate Loci for High-Altitude Adaptation in Andean Populations. *Human Genomics*. 4:79-90.
- 2009** S.B. Ng, E.H. Turner, P.D. Robertson, S.D. Flygare, **A.W. Bigham**, C. Lee, T. Shaffer, M. Wong, A. Bhattacharjee, E.E. Eichler, M. Bamshad, D.A. Nickerson, J. Shendure. Targeted capture and massively parallel sequencing of 12 human exomes. *Nature*. 461:272-6
- 2009** A.L. Willig, K.R. Casazza, J. Divers, **A.W. Bigham**, B.A. Gower, G.R. Hunter, J.R. Fernandez. Metabolism. Uncoupling protein 2 Ala55Val polymorphism is associated with a higher acute insulin response to glucose. *Metabolism*. 58:877-81.
- 2009** C.G. Julian, M.J. Wilson, M. Lopez, H. Yamashiro, W. Tellez, A. Rodriguez, **A.W. Bigham**, M.D. Shriver, C. Rodriguez, E. Vargas, L.G. Moore. Augmented uterine artery blood flow and oxygen delivery protect Andeans from altitude-associated reductions in fetal growth. *American Journal of Physiology Regulatory Integrative, and Comparative Physiology*. 296:R1564-75
- 2008** **A.W. Bigham**, M. Kiyamu, F. León-Velarde, E.J. Parra, M. Rivera-Ch, M.D. Shriver, and T.D. Brutsaert. Angiotensin-Converting Enzyme Genotype and Arterial Oxygen Saturation at High Altitude in Peruvian Quechua. *High Altitude Medicine and Biology*. 9:167-178.
- 2007** M. J. Wilson, M. Lopez, M. Vargas, C. Julian, W. Tellez, A. Rodriguez, **A. Bigham**, J. F. Armaza, S. Niermeyer, M. Shriver, E. Vargas, L. G. Moore. Greater uterine artery blood flow during pregnancy in multigenerational (Andean) than shorter-term (European) high-altitude residents. *American Journal of Physiology: Regulatory, Integrative, and Comparative Physiology*. 293:R1313-1324.
- 2007** X. Mao, **A. W. Bigham**, R. Mei, G. Gutierrez, K.M. Weiss, T.D. Brutseart, F. Leon-Velarde, L. G. Moore, E. Vargas, P.M. McKeigue, M.D. Shriver, E.J. Parra. A genomewide admixture mapping panel for Hispanic/Latino populations. *American Journal of Human Genetics*. 80:1171-1178.
- 2006** M.D. Shriver, R. Mei, **A. Bigham**, X. Mao, T.D. Brutseart, E.J. Parra, L. G. Moore. "Finding the genes underlying adaptation to hypoxia using genomic scans for genetic adaptation and admixture mapping." *Advances in Experimental Medicine and Biology*. 588:89-100.
- 2004** M.F. Hammer, D. Garrigan, E. Wood, J.A. Wilder, Z. Mobasher, **A.W. Bigham**, J.G. Krenz and M.W. Nachman. "Heterogeneous patterns of variation among multiple human X-linked loci: The

possible role of diversity reducing selection in non-Africans.”
Genetics. 167:1841-53.

- 2004** L Quintana-Murci, **A.W. Bigham**, H. Rouba, A. Barakat, K. McElreavey, M.F. Hammer. “Y-chromosomal STR haplotypes in Berber and Arabic-speaking populations from Morocco.” *Forensic Science International*. 140:113-5.

PUBLICATIONS

- 2007** K.M. Weiss, **A.W. Bigham**. “So Mortal and So Strange a Pang”: A Tribute to Paul T. Baker: Is the high life a matter of adaptability or adaptation? *Evolutionary Anthropology*. 16:164-171.

INVITED PAPERS

- 2010** Emerging Infectious Disease. Center for Disease Control, Atlanta, Georgia.

PAPERS AND POSTERS PRESENTED

- 2011** **A.W. Bigham**, K. Dahlstrom, M. Rieder, J. Kriesel, D.A. Nickerson, M. Bamshad. “Selection Mapping to Identify West Nile Virus Susceptibility Loci.” American Association of Physical Anthropologists, 78th Annual Meeting (Minneapolis, Minnesota).
- 2010** **A.W. Bigham**, K. Dahlstrom, M. Rieder, J. Kriesel, D.A. Nickerson, M. Bamshad. “Selection Mapping to Identify West Nile Virus Susceptibility Loci.” American Society for Human Genetics, 59th Annual Meeting (Washington, DC).
- 2009** **A.W. Bigham**, K. Dahlstrom, M. Rieder, J. Kriesel, D.A. Nickerson, M. Bamshad. “Selection Mapping to Identify West Nile Virus Susceptibility Loci.” American Society for Human Genetics, 59th Annual Meeting (Honolulu, HI).
- 2009** K. J. Buckingham, **A. W. Bigham**, S. Husain, J. Kriesel, A. Rutherford, N. M. Astakhova, A. A. Perelygin, M. P. Busch, K. Murray, M. A. Brinton, M. J. Bamshad. “Host Genetic Susceptibility Factors for Severe West Nile Virus Infection” American Society for Human Genetics, 59th Annual Meeting (Honolulu, HI).
- 2009** **A.W. Bigham**, M.J. Bamshad. “Patterns of Genetic Variation at the *GYPA* locus in human populations.” American Association of Physical Anthropologists, 78th Annual Meeting (Chicago, Illinois).
- 2009** L.G. Moore, M.J Wilson, C.G Julian, **A.W. Bigham**, M.D. Shriver. “Natural selection at high altitude” American Association of Physical Anthropologists, 78th Annual Meeting (Chicago, Illinois).
- 2008** **A.W. Bigham**, X. Mao, T. Brutsaert, R. Mei, L.G. Moore, M.D. Shriver. “Comparing signatures of natural selection in two high altitude human groups.” American Association of Physical Anthropologists, 77th Annual Meeting (Columbus, Ohio).

- 2006** **A.W. Bigham**, X. Mao, L. Moore, M.D. Shriver. "Screening candidate genes for evidence of natural selection in Andean populations." American Association of Physical Anthropologists, 75th Annual Meeting (Anchorage, Alaska).
- 2006** T.D. Brutsaert, **A.W. Bigham**, M. Kiyamu, E.J. Parra, M.D. Shriver. "Physiological traits associated with the angiotensin converting enzyme (ACE) insertion/deletion (I/D) polymorphism in Peruvian Quechua." Human Biology Association, 31st Annual Meeting (Anchorage, Alaska).
- 2005** **A.W. Bigham**, X. Mao, L. Moore, M.D. Shriver. "Searching for signatures of natural selection in high altitude populations." American Association of Physical Anthropologists, 74th Annual Meeting (Milwaukee, Wisconsin).
- 2004** X. Mao, **A.W. Bigham**, L. Moore, M.D. Shriver. "Identifying loci under positive natural selection indicated by high branch length in population comparison. Genomes and Evolution, 2004 Meeting (State College, Pennsylvania).
- 2004** M. F. Hammer, E.T. Wood, M.M. Pilkington, **A.W. Bigham**, Z. Mobasher, G. Koki, C. Mgone, J. Friedlaender. "Patterns of genomic variation in the Baining of New Britain in relation to other world populations." American Association of Physical Anthropologists, 73rd Annual Meeting (Tampa, Florida).
- 2004** M.M. Pilkington, **A.W. Bigham**, S.B. Kingan, Z. Mobasher, J.A. Wilder, E.T. Wood, M.F. Hammer. "Patterns of human variation as reflected by multi-locus genetic comparisons." American Association of Physical Anthropologists, 73rd Annual Meeting (Tampa, Florida).
- 2004** T. M. Karafet, L.P. Osipova, S.B. Kingan, **A.W. Bigham**, L. Mayer, J.A. Wilder, M.F. Hammer "Insight into demographic events and population history of Siberian populations: A comparison of Y-chromosome, X-chromosome and mitochondrial data." American Association of Physical Anthropologists, 73rd Annual Meeting (Tampa, Florida).

PROFESSIONAL SERVICE

- 2009** Genome Training Grant Symposium Committee, Department of Genome Sciences, The University of Washington
- 2007** Colloquia and Seminar Committee, Department of Anthropology, Pennsylvania State University
- 2006** Treasurer, Anthropology Graduate Student Association, Department of Anthropology, Pennsylvania State University

PROFESSIONAL MEMBERSHIPS

American Association of Physical Anthropologists

American Association of Human Genetics

American Association of Anthropological Genetics