Aaron A. HEISS

Curriculum Vitae

Research Scientist and Simons Foundation Fellow
Eunsoo KIM Laboratory
Department of Invertebrate Biology
American Museum of Natural History
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Academic Qualifications

Doctor of Philosophy (Biology), 2012, Dalhousie University, Halifax, Nova Scotia, Canada (supervisor: Alastair G. B. Simpson).

Master of Science (Botany), 2006, University of British Columbia, Vancouver, British Columbia, Canada (supervisor: Patrick J. Keeling).

Bachelor of Science (Biology), 2002, Portland State University, Portland, Oregon, USA.

Bachelor of Arts (Music), 1995, Bennington College, Bennington, Vermont, USA.

Publications (dates separated by commas indicate online & print publications, respectively)

15. Heiss AA, Shiratori T, Avecilla G, Gyaltshen Y, Ishida K, Kim E: Isolation and description of a new strain of mantamonad. In prep.

14. Heiss AA, Heiss AW, Lucaks K, Kim E: The microtubular anatomy of the glaucophyte *Cyanophora cuspidata* revisited in the light of modern phylogeny. In prep.

13. Heiss AA, Kolisko M, Ekelund F, Brown MW, Roger AJ, Simpson AGB: The ancestral form of eukaryotes revealed or phylogenomic error?: Morphology and multigene phylogeny of a deep-branching malawimonad (*Danskemonas okellyi* n. gen. n. sp.). In prep.

12. Heiss AA, Lee WJ, Ishida K, Simpson AGB (2015): Cultivation and characterisation of new species of apusomonads (the sister group to opisthokonts), including close relatives of *Thecamonas* (*Chelonemonas* n. gen.). *J. Eukaryot. Microbiol.* **62** (5): 637–649.

11. Brown MW, Sharpe SC, Silberman JD, Heiss AA, Lang BF, Simpson AGB, Roger AJ (August, October 2013): Phylogenomics demonstrates that breviate flagellates are related to opisthokonts: implications for the origin of genes involved in multicellularity. *Proc. R. Soc. B* **280** (1769).

10. Heiss AA, Walker G, Simpson AGB (July, September 2013): The microtubular cytoskeleton of *Thecamonas*, a sister lineage to the opisthokonts. *Protist*, **164** (5): 598–621.

9. Kamikawa R, Brown MW, Nishimura Y, Sako Y, Heiss AA, Yubuki N, Gawryluk R, Simpson AG, Roger AJ, Hashimoto T, Inagaki Y (June 2013): Parallel re-modeling of EF-1 α function: divergent EF-1 α genes co-occur with EFL genes in diverse distantly related eukaryotes. *BMC Evolutionary Biol.* **13**: 121.

8. Heiss AA, Walker G, Simpson AGB: The flagellar apparatus of *Breviata anathema*, a eukaryote without a clear supergroup affinity (March, August 2013). *Europ. J. Protistol.* **49** (3): 354–372.

7. Adl SM, Simpson AGB, Lane CE, Lukeš J, Bass D, Bowser SS, Brown MW, Burki F, Dunthorn M, Hampl V, Heiss A, Hoppenrath M, Lara E, le Gall L, Lynn DH, McManus H, Mitchell EAD, Mozley-Stanridge SE, Parfrey LW, Pawlowski J, Rueckert S, Shadwick RS, Schoch CL, Smirnov A, Spiegel FW (September 2012): The revised classification of eukaryotes. *J. Eukaryot. Microbiol.* **57** (5): 429–493.

6. Kerney R, Kim E, Hangarter RP, Heiss AA, Bishop C, Hall BK (April 2011): Intracellular invasion of green algae in a salamander host. *Proc. Nat'l. Adac. Sci. USA* **108** (16): 6497–6502.

5. Heiss AA, Walker G, Simpson AGB (March, July 2011): The ultrastructure of *Ancyromonas*, a eukaryote without supergroup affinities. *Protist* **162** (3): 373–393.

4. Heiss AA, Walker G, Simpson AGB (April, May–June 2010): Clarifying the taxonomic identity of a phylogenetically important group of eukaryotes: *Planomonas* is a junior synonym of *Ancyromonas*. *J. Eukaryot. Microbiol.* **57** (3): 285–293.

3. Park JS, Kolisko M, Heiss AA, Simpson AGB (July–August 2009): Light microscopic observations, ultrastructure, and molecular phylogeny of *Hicanonectes teleskopos* n. gen., n. sp., a deep-branching relative of diplomonads. *J. Eukaryot. Microbiol.* **56** (4): 373–384.

2. de Koning AP, Noble GP, Heiss AA, Wong J, Keeling PJ (January 2008): Environmental PCR survey to determine the distribution of a non-canonical genetic code in uncultivable oxymonads. *Environ. Microbiol.* **10** (1): 65–74.

1. Heiss AA, Keeling PJ (July, August 2006): The phylogenetic position of the oxymonad *Saccinobaculus* based on SSU rRNA. *Protist* **157** (3): 335–344.

Scientific Presentations

9. Heiss AA, Kim E (2015): The flagellar apparatus of *Cyanophora*. European Congress of Protistology VII, 5–10 September 2015, Seville, Spain (poster presentation).

8. Heiss AA, Kim E (2015): The flagellar apparatus of *Cyanophora*. 50th Annual Meeting of the Phycological Society of America, 8–13 August 2015, Philadelphia, Pennsylvania, USA (oral presentation).

7. Heiss AA, Avecilla G, Shiratori T, Ishida K, Kim E (2015): Morphology and genomics of a new mantamonad. 50th Annual Meeting of the Phycological Society of America, 8–13 August 2015, Philadelphia, Pennsylvania, USA (poster presentation).

6. Heiss AA, Kolisko M, Ekelund F, Brown MW, Roger AJ, Simpson AGB (2014): Malawimonad ultrastructure and molecular phylogenetics. International Society for Evolutionary Protistology XX, 3–8 August 2014, Banff, Alberta, Canada (oral presentation).

5. Heiss AA, Kolisko M, Ekelund F, Brown MW, Roger AJ, Simpson AGB (2013): Malawimonad ultrastructure and phylogenetics. International Congress of Protistology XIV, 28 July–2 August 2013, Vancouver, BC, Canada (poster).

4. Brown MW, Sharpe SC, Silberman JD, Simpson AGB, Heiss AA, Roger AJ (2012): Finding homes for outcast protistan lineages through phylogenomics; the case of the breviates. International Society for Evolutionary Protistology XIX, 29 July–3 August 2012, Oslo, Norway (oral presentation by MWB).

3. Heiss AA, Walker G, Simpson AGB (2012): The cytoskeleton of *Breviata* (& *Thecamonas*) and the nature of the ancestral eukaryote flagellar apparatus. International Society for Evolutionary Protistology XIX, 29 July–3 August 2012, Oslo, Norway (oral presentation by AGBS).

2. Heiss AA, Walker G, Simpson AGB (2010): The cytoskeleton of Apusozoa, and its implications for deep eukaryotic cell evolution. International Society for Evolutionary Protistology XVIII, 2–7 July 2010, Kanazawa, Japan (oral presentation).

1. Heiss AA, Walker G, Simpson AGB (2008): The ultrastructure of *Ancyromonas*, a eukaryote without supergroup affiliation. International Society of Protistologists 59 / International Society for Evolutionary Protistology XVII, 21–26 July 2008, Halifax, NS, Canada (oral presentation).

Awards, Scholarships, and Fellowships

Gerstner Scholarship and Lerner-Gray Fellowship (full postdoctoral appointment), held January 2014–December 1015 at the American Museum of Natural History.

Japan Society for the Promotion of Science Post-Doctoral Fellowship (short-term), held May–December 2013 at the University of Tsukuba.

ISoP Travel Award (US $500), awarded by the International Society of Protistologists to attend ISEP XVII, July–August 2010.

Dalhousie Faculty of Graduate Studies Scholarship (about Cdn $23,000 per annum; amount varies), awarded by Dalhousie University Department of Biology, held Fall 2006–Summer 2010 at Dalhousie University.

UBC University Graduate Fellowship (Cdn $16,000), awarded by UBC Faculty of Graduate Studies, held Fall 2005–Summer 2006 at the University of British Columbia.

Frances Chave Memorial Scholarship (Cdn $2,200) awarded by UBC Department of Botany, held Fall 2004–Summer 2005 at the University of British Columbia.

Dean's List, Fall 2001–Spring 2002, Portland State University.

Solon E. Summerfield Scholarship (about US $7,000 — not formally assessed: part of Bennington Grant), awarded by and held at Bennington College, Fall 1991–Fall 1993.

Teaching Experience

Scientific Imaging, Fall 2014, Richard Gilder Graduate School, American Museum of Natural History (co-taught with Eunsoo Kim).

Electron Microscopy module of Cell Biology (2nd year)*, Fall 2008–Winter 2010, Dalhousie University.

Microbial Eukaryotes (3rd year)*, Fall 2010, Dalhousie University.

Invertebrate Biology (3rd year)*, Fall 2008 & Fall 2009, Dalhousie University.

Evolution (2nd year)*, Winter 2007, Dalhousie University.

Principles of Biology (1st year)*, Fall 2006, Dalhousie University.

Vertebrate Skeletal Articulation (4th year)**, Fall 2002–Spring 2004, Portland State University.

Marine Mammals (4th year)**, Winter 2003, Portland State University.

Marine Biology (3rd year)**, Spring 2002, Portland State University.

Tutor for Comparative Animal Physiology (3rd year)*, Fall 1991, Bennington College.

* Teaching assistantship performed in the course of graduate study.

** Teaching assistantship officially performed as extension of duties as museum curator.

Other Relevant Experience

Assistant Curator, Museum of Vertebrate Biology, Portland State University, May 2002–April 2004.

Laboratory Technician, Bruker Instruments, Inc., Billerica, Massachussetts, USA, June 1990–August 1995 (summers).

Specific Skills

Culture establishment and maintenance, including single-cell isolation and cultivation.

Preparation of cell cultures for electron microscopy: chemical fixation, critical-point drying, metal-coating for SEM; chemical fixation and high-pressure freezing/freeze-substitution for TEM, ultramicrotomy, staining.

Maintenance of TEM, including beam and aperture alignment and filament changing.

Proficiency on operation of SEM and TEM, including goniometry and serial section observation.

Analysis, interpretation, and computer-based reconstruction of subcellular components.

Proficiency on light microscope using oil immersion, phase contrast, and Nomarski differential interference contrast.

Extraction of DNA from cell cultures and environmental samples.

Extraction of DNA from single-cell isolates.

Preparation of RNA from large-batch cell cultures: TRIzol extraction and purification, cDNA synthesis, mRNA selection

PCR-based amplification, ligation and cloning, and sequencing of DNA, including operation of sequencing equipment.

Manual alignment, masking, and phylogenetic analysis of sequence data.

Development of laboratory equipment for 3-D printing.

Professional Affiliations

International Society of Protistologists, 2005–present.

International Society for Evolutionary Protistology, 2008–present.

Society for Molecular Biology and Evolution, 2007–2009.