

## Curriculum Vitae Alan C. Love

Department of Philosophy  
University of Minnesota  
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### EMPLOYMENT

Assistant Professor, Dept. of Philosophy	Univ. of Minnesota	2006-present
Assistant Professor, Dept. of Philosophy	UC Santa Cruz	2005-2006

### EDUCATION

Ph.D. History and Philosophy of Science	University of Pittsburgh	2005
M.A. Biology (Ecol., Evol., & Behav.)	Indiana Univ., Bloomington	2004
M.A. Philosophy	University of Pittsburgh	2002
B.S. Biology (Minor: Philosophy)	M.I.T.	1995

### AREAS OF SPECIALIZATION

Philosophy of Biology, Philosophy of Science, Biology

### AREAS OF COMPETENCE

Darwin, History of Biology, Logic, Modern Philosophy/Science, Science and Religion

### PUBLICATIONS

#### *Journal Articles*

Love, A.C. (in press) "Interdisciplinary Lessons for the Teaching of Biology from the Practice of Evo-devo", *Science & Education*.

Hüttemann, A. and A.C. Love (in press) "Aspects of reductive explanation in biological science: intrinsicity, fundamentality, and temporality", *British Journal for Philosophy of Science*.

Brigandt, I. and A.C. Love (2010) "Evolutionary novelty and the Evo-devo synthesis: field notes", *Evolutionary Biology* 37:93-99.

Love, A.C. (2010) "Darwin's 'imaginary illustrations': creatively teaching evolutionary concepts and the nature of science", *The American Biology Teacher* 72:82-89.

Love, A.C. (2010) "Idealization in evolutionary developmental investigation: a tension between phenotypic plasticity and normal stages", *Philosophical Transactions of the Royal Society B* 365:679-690.

Love, A.C. (2009) "Marine invertebrates, model organisms, and the modern synthesis: epistemic values, evo-devo, and exclusion", *Theory in Biosciences* 128:19-42.

Love, A.C. (2009) "Typology reconfigured: from the metaphysics of essentialism to the epistemology of representation", *Acta Biotheoretica* 57:51-75.

Love, A.C. (2008) "Explaining evolutionary innovation and novelty: criteria of adequacy and multidisciplinary prerequisites", *Philosophy of Science* 75:874-886.

Love, A.C. (2008) "From philosophy to science (to natural philosophy): evolutionary developmental perspectives", *The Quarterly Review of Biology* 83:65-76.

- Love, A.C., A.E. Lee, M.E. Andrews, and R.A. Raff (2008) “Co-option and dissociation in larval origins and evolution: the sea urchin larval gut”, *Evolution & Development* 10:74–88.
- Love, A.C. (2007) “Functional homology and homology of function: biological concepts and philosophical consequences”, *Biology & Philosophy* 22:691–708.
- Love, A.C., M.E. Andrews, and R.A. Raff (2007) “Gene expression patterns in a novel animal appendage: The sea urchin pluteus arm”, *Evolution & Development* 9:51–68.
- Love, A.C. (2006) “Reflections on the middle stages of evo-devo’s ontogeny”, *Biological Theory: Integrating Development, Evolution, and Cognition* 1:94–97.
- Love, A.C. (2006) “Evolutionary morphology and evo-devo: hierarchy and novelty”, *Theory in Biosciences* 124:317–333.
- Love, A.C. and R.A. Raff (2006), “Larval ectoderm, organizational homology, and the origins of evolutionary novelty”, *Journal of Experimental Zoology (Mol Dev Evol)* 306B:18–34.
- Ingram, E.L., E. Lehman, A.C. Love, and K.M. Polacek (2004) “Fostering inquiry in nonlaboratory settings”, *Journal of College Science Teaching* 34:39–43.
- Raff, R.A. and A.C. Love (2004) “Kowalevsky, comparative evolutionary embryology, and the intellectual lineage of evo-devo”, *Journal of Experimental Zoology (Mol Dev Evol)* 302B:19–34.
- Love, A.C. (2003) “Evolvability, dispositions, and intrinsicity”, *Philosophy of Science* 70:1015–1027.
- Love, A.C. and R.A. Raff (2003) “Knowing your ancestors: themes in the history of evo-devo”, *Evolution & Development* 5:327–330.
- Love, A.C. (2003) “Evolutionary morphology, innovation, and the synthesis of evolutionary and developmental biology”, *Biology & Philosophy* 18:309–345.
- Love, A.C. (2002) “Darwin and *Cirripedia* prior to 1846: exploring the origins of the barnacle research”, *Journal of the History of Biology* 35:251–289.

### **Books**

Love, A.C. (ed) *Conceptual Change in Biology: Scientific and Philosophical Perspectives on Evolution and Development*. Boston Studies in Philosophy of Science. Berlin: Springer. [under contract]

### **Book Chapters and Related**

Love, A.C. (forthcoming) “Material versus formal theories in philosophy of science: a methodological interpretation”, in H. de Regt, S. Okasha, and S. Hartmann (eds), *Proceedings of the Second European Philosophy of Science Association Meeting*. Berlin: Springer.

Love, A.C. and A. Hüttemann (in press) “Comparing part-whole explanations in biology and physics”, in D. Dieks, W.J. Gonzalez, S. Hartmann, T. Uebel, and M. Weber (eds), *Explanation, Prediction, and Confirmation: New Trends and Old Ones Reconsidered*. Berlin: Springer.

Love, A.C. (2011) “Darwin’s functional reasoning and homology”, in M. Wheeler (ed), *150 Years of Evolution: Darwin’s Impact on Contemporary Thought & Culture*. San Diego: SDSU Press, 49–67.

Love, A.C. (2010) “Rethinking the structure of evolutionary theory for an extended synthesis”, in M. Pigliucci and G. Müller (eds) *Evolution—The Extended Synthesis*. Cambridge, MA: MIT Press, 403–441.

Brigandt, I. and A.C. Love (2008) “Reductionism in biology”, *The Stanford Encyclopedia of Philosophy*: <http://plato.stanford.edu/entries/reduction-biology/>.

Love, A.C. (2008) “Explaining the ontogeny of form: philosophical issues”, in S. Sarkar and A. Plutynski (eds) *A Companion to the Philosophy of Biology*. Malden, MA: Blackwell Publishers, 223–247.

Love, A.C. (2007) “Morphological and paleontological perspectives for a history of evo-devo”, in M. Laubichler and J. Maienschein (eds) *From Embryology to Evo-Devo: A History of Developmental Evolution*. Cambridge, MA: MIT Press, 267–307.

Love, A.C. (2002) “Comments on Robert Brandon’s “The difference between drift and selection: A reply to Millstein””, <http://philsci-archive.pitt.edu/documents/disk0/00/00/08/55/index.html> (web publication).

#### **Essay Review Articles / Symposia**

Love, A.C., I. Brigandt, K. Stotz, D. Schweitzer, and A. Rosenberg (2008) “More worry, less love?”, *Metascience* 17:1–26. (Review symposium of Alexander Rosenberg’s *Darwinian Reductionism: Or, How to Stop Worrying and Love Molecular Biology* [2006].)

Love, A.C. (2006) “Taking development seriously: who, what, where, why, when, how?”, *Biology & Philosophy* 21:575–589. (Essay Review of *Embryology, Epigenesis, and Evolution: Taking Development Seriously*, by Jason S. Robert, [2004].)

Love, A.C. (2005) “The return of the embryo”, *Biology & Philosophy* 20: 567-584. (Essay Review of *Keywords and Concepts in Evolutionary Developmental Biology*, edited by Brian Hall and Wendy Olson, [2003].)

#### **Book Reviews**

Love, A.C. (forthcoming) “Philosophical lessons from scientific biography: form, function, model organisms, and pictorial representations”, (A Review of *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought* by Robert J. Richards [2009]), *Philosophy of Science*.

Love, A.C. (in press) “The allure of perennial questions in biology: temporary excitement or substantive advance?” (A Review of *Form and Function in Developmental Evolution* edited by Manfred D. Laubichler and Jane Maienschein, [2009]), *Metascience*.

Love, A.C. (2011) “Walking in Darwin’s Galápagos shoes”, (A Review of *Darwin in Galápagos: Footsteps to a New World* by K. Thalia Grant and Gregory B. Estes, [2009]), *Metascience* 20:117–119.

Love, A.C. (2008) “Scientific realism: just out of reach?”, (A Review of *Exceeding our Grasp: Science, History, and the Problem of Unconceived Alternatives* by P. Kyle Stanford, [2006]), *Review of Metaphysics* 62:155–157.

Love, A.C. (2008) “Revisiting evolutionary foundations”, (A Review of *Making Sense of Evolution: The Conceptual Foundations of Evolutionary Biology* by Massimo Pigliucci and Jonathan Kaplan, [2006]), *Mind* 117:201–205.

Love, A.C. (2007) “Revolutionary evo-devo?”, (A Review of *Endless Forms Most Beautiful: The New Science of Evo-devo* by Sean Carroll, [2005]), *Journal of the History of Biology* 40:594–597.

Love, A.C. (2007) “The hedgehog, the fox, and reductionism in biology”, (A Review of *Darwinian Reductionism: Or, How to Stop Worrying and Love Molecular Biology* by Alexander Rosenberg, [2006]), *Evolution* 61:2736–2738.

Love, A.C. (2007) “Putting the pieces together”, (A Review of *Fins into Limbs: Evolution, Development, and Transformation* edited by Brian Hall, [2007]), *Science* 317:1502–1503.

Love, A.C. (2006) “Looking beyond gene concepts”, (A Review of *What Genes Can’t Do* by Lenny Moss, [2004]), *Philosophy of Science* 73:247–250.

Love, A.C. (2006) “Plausibility, conceivability, and possibility”, (A Review of *The Plausibility of Life* by Marc Kirschner and John Gerhart, [2005]), *BioScience* 56:772–774.

Love, A.C. (2006) “History, scientific methodology, and the ‘squishy’ sciences”, (A Review of *Science Rules: A Historical Introduction to Scientific Methods* edited by Peter Achinstein, [2004]), *Perspectives in Biology and Medicine* 49:452–456.

Love, A.C. (2005) “Thinking historically about embryos and evolution”, (A Review of *The Changing Role of the Embryo in Evolutionary Thought: Roots of Evo-Devo* by Ron Amundson, [2005]), *Notre Dame Philosophical Reviews*: <http://ndpr.nd.edu/review.cfm?id=4421>.

Love, A.C. (2002) “Christianity for Darwinians?” (A Review of *Can a Darwinian be a Christian?* by Michael Ruse, [2001]), *Metascience* 11:115–118.

#### AWARDS

- Global Programs & Strategy Alliance, International Travel Award, 2011
- Institute for Advanced Study Faculty Seminar Award, spring semester 2010
- McKnight Land Grant Professorship, 2009-2011
- SSHRC (Canada) Grant – “Integrating different biological approaches: a philosophical contribution” (Collaborator/Core Team Member with I. Brigandt, University of Alberta), 2009-2011
- Graduate School – Office of Interdisciplinary Initiatives Grant: “Conceptual Foundations of Evolutionary Biology Graduate Group” (Team Member with M. Borrello, M. Travisano, and C.K. Waters), 2008-2010
- CLA Single Semester Leave, 2008-9
- McKnight Arts and Humanities Endowment Summer Fellowship, 2007
- University of Minnesota Faculty Summer Research Fellowship, 2007
- American Philosophical Association/Philosophy of Science Association Travel Grant, 2006
- UCSC COR Faculty Research Grant, 2005-6
- Andrew Mellon Predoctoral Fellowship, 2004-2005
- George Hudock Fellowship, 2003 & 2004
- Harvey Fellowship from the Mustard Seed Foundation, 1999-2002

#### MAJOR PRESENTATIONS († = invited)

##### 2011

“Formal versus Material Theories in Philosophy of Science: A Methodological Interpretation”, American Philosophical Association - Pacific Division Meeting, San Diego, CA, April 2011.

“Pluralism, Hierarchical Explanations, and the Metaphysics of Science”, American Philosophical Association - Central Division Meeting, Minneapolis, MN, March 2011. †

“Reduction and Emergence: Between Science and Philosophy”, Chicago Social Brain Network Symposium, Ft. Myers, FL, February 2011. †

“Asa Gray and Conceptual Change: Teleology and Variation”, History of Science Brown Bag Lunch Series, University of Wisconsin – Madison, WI, February 2011. †

“Darwin’s Functional Reasoning, Homology, and the Structure(s) of Evolutionary Theory”, Evolution Seminar Series, University of Wisconsin – Madison, WI, February 2011. †

##### 2010

“The Developmental Basis of Novelty – Reflections on Explanatory Integration”, SSHRC workshop on ‘Perspectives on Evolutionary Novelty and Evo-devo: Integrating Explanatory Approaches in Biology’, McGill University – Redpath Museum, Montreal, Canada, November 2010.

“Modeling Experimental Evidence in Developmental Biology: *In Situ* Hybridization and Serial Idealization”, Philosophy of Scientific Experimentation Workshop, Center for Philosophy of Science, University of Pittsburgh, PA, October 2010.

“Reductionism and Evolutionary Explanations of Morality: Necessary Prerequisites“, Evolution and Ethics Conference, Peking University, Beijing, China, October 2010. †

“Models of Time for Reductive Explanations in Experimental Biology“, Types of Explanation in the Special Sciences – The Case of Biology and History, University of Cologne, Germany, September/October 2010. †

“Sciences without Theories: Structured Problems in Developmental Biology“, Institute for History and Philosophy of Science and Technology – Philosophy of Biology Seminar, University of Paris, France, September 2010. †

“A Pluralist Stance on Top-Down Causation“, Top-Down Causation: An Integrating Theme Within and Across the Sciences, The Royal Society, London, UK, September 2010. †

“Pluralism, Reduction, and the Metaphysics of Science“, Science Engages Metaphysics: Emergence, Reduction and Explanation, Wheaton College Science Station, Black Hills, SD, July 2010. †

“Evolutionary Innovation and Novelty: Conceptual Developments Since Dahlem“, Conceptual Change in Biological Science: Evolutionary Developmental Biology, 1981-2011, Max Planck Institute for the History of Science, Dahlem, Berlin, July 2010.

“Reductionism and the Philosophy of Biology“, lectures delivered for the St. Thomas Summer Seminar in Philosophy of Religion and Philosophical Theology, University of St. Thomas, St. Paul, MN, June 2010. †

“The Origin and Evolution of Marine Invertebrate Larval Forms: Historical and Philosophical Perspectives“, Evolutionary Transitions in Marine Invertebrate Larval Forms, Picker Interdisciplinary Science Institute, Colgate University, Hamilton, NY, June 2010. †

“Commentary on Andrew Margenot and Derek Turner’s ‘Contingency and Relative Significance Debates in Biology’“, American Philosophical Association - Pacific Division Meeting, San Francisco, CA, April 2010. †

“Modeling Experimental Evidence: Idealization and *In Situ* Hybridization“, The Experimental Side of Modeling – II, San Francisco State University, CA, March 2010. †

“Evo-devo and Individuating Evolutionary Theory: A Different Kind of Challenge“, Challenges to Evolutionary Theory: An Interdisciplinary Workshop, University of Toronto, Canada, March 2010. †

“Sciences without Theories?“, American Philosophical Association - Central Division Meeting, Chicago, IL, February 2010.

“Three Aspects of Reductive Explanations in Biological Science“, Minnesota Center for Philosophy of Science Colloquium, University of Minnesota, Minneapolis, January 2010.

## 2009

“Aspects of Reductive Explanations in Biological Science: Intrinsicity, Fundamentality, and Temporality“, Emergence and Reduction in the Sciences – Second Pittsburgh-Paris Workshop, Center for Philosophy of Science, University of Pittsburgh, PA, December 2009.

“Darwin and Philosophy of Biology: Structure, Novelty, and Interdisciplinarity“, 150 Years of Evolution: Darwin’s Impact on the Humanities and the Social Sciences, San Diego State University, CA, November 2009. †

“Mechanisms for Generating Novel Variants: Conceptual Issues and Questions“, SSHRC workshop on ‘Integrating different biological approaches’, University of Alberta, Edmonton, November 2009.

“Formal versus Material Theories in Philosophy of Science“, European Philosophy of Science Association Meeting, Amsterdam, The Netherlands, October 2009.

“The Structure of Biological Problems and Explaining Evolutionary Novelty: Scientific and Philosophical Implications”, Symposium on Philosophy of Evolution, University of Groningen, The Netherlands, October 2009. †

“Evolutionary Innovations and Multidisciplinary Explanation in Biology: Prospects and Problems”, Symposium on ‘Evolutionary Innovations: Where Ecology, Development And Macroevolution Intersect’, AAAS-Pacific Division, San Francisco State University, San Francisco, CA, August 2009.

“Investigating the Meaning of Biological Information with Noise”, International Society for the History, Philosophy, and Social Studies of Biology, University of Queensland, Brisbane, Australia, July 2009.

“The Heterogeneity of Experimental Practices in Developmental Biology: Epistemological Implications”, Society for the Philosophy of Science in Practice, University of Minnesota, Minneapolis, MN, June 2009.

“Temporal Dimensions of Reductionism in Biology”, American Philosophical Association - Pacific Division Meeting, Vancouver, British Columbia, Canada, April 2009.

“Temporal Dimensions of Reductionism in Biology”, Department of Philosophy, MSU – Mankato, MN, March 2009. †

### 2008

“Rethinking Conceptual Change in the Context of Evolutionary Developmental Biology”, Western Canadian Philosophical Association Meeting, University of Alberta, Edmonton, October 2008.

“The Structure of Evolutionary Theory and Biological Knowledge”, Altenberg Workshop in Theoretical Biology – ‘Toward an Extended Evolutionary Synthesis’, Konrad Lorenz Institute for Evolution & Cognition Research, Altenberg, Austria, July 2008. †

“Asa Gray’s Evolving Perspective on Teleology, Variation, and Natural Theology”, International Society for the History of Philosophy of Science, Vancouver, British Columbia, June 2008.

“Development and Evolution in Context: Embryos in Erotetic Dialogue”, Marine Biological Laboratories - Arizona State University History of Biology Seminar, Woods Hole, MA, May 2008. †

“Temporal Dimensions of Reductionism in Biology”, Science Studies Symposium: McKnight Summer Fellows Presentation (“Thinking Through Science: Philosophical Perspectives on Biology, Geography, and History”), University of Minnesota, Minneapolis, May 2008.

“The Structure of Evolutionary Theory and Biological Knowledge: Epistemic Materials for a 21st Century Synthesis” Department of Ecology and Evolutionary Biology, SUNY – Stony Brook, New York, March 2008. †

### 2007

“Respondent to Kevin Theissen’s ‘Global Warming: What We Know and What We Do Not Know’”, North Central Program for Science and Theology, University of St. Thomas, St. Paul, MN, November 2007. †

“Consequences of an Intelligent Discussion about Design with Darwin: Asa Gray’s Evolving Perspective on Teleology and Natural Theology”, &HPS – Conference in Integrated History and Philosophy of Science, University of Pittsburgh, Pittsburgh, PA, October 2007.

“Explanatory Adequacy in Philosophical Analyses of Reductionism”, International Society for the History, Philosophy, and Social Studies of Biology, University of Exeter, Exeter, UK, July 2007.

“Functional Homology and Homology of Function”, International Society for the History, Philosophy, and Social Studies of Biology, University of Exeter, Exeter, UK, July 2007.

“Reduction, Representation, and Temporality in Explanations of Ontogeny”, Center for Philosophy and Ethics of Science, University of Hannover, Hannover, Germany, June 2007. †

“Reduction, Representation, and Temporality in Explanations of Ontogeny”, Department of Philosophy, University of Münster, Münster, Germany, June 2007. †

“From Philosophy to Science: Evolutionary Developmental Perspectives”, Science and Philosophy (Sci-Phi) Symposium, SUNY-Stony Brook (Manhattan), New York, March 2007.

## 2006

“Physical Reductionism and Molecular Biology: Causation, Dispositions, and Protein Folding”, Department of Philosophy, St. Cloud State University, MN, November 2006. †

“Functional Homology and Homology of Function”, Philosophy and Developmental Biology Workshop, Vancouver, British Columbia, November 2006.

“Explaining Evolutionary Innovation and Novelty: Criteria of Explanatory Adequacy and Multidisciplinary Prerequisites”, Philosophy of Science Association Meeting, Vancouver, British Columbia, Canada, November 2006.

“Commentary on Robert Wilson’s *Boundaries of the Mind* and *Genes and the Agents of Life* (‘Author Meets Critics’ Session)”, American Philosophical Association Meeting (Pacific Division), Portland, OR, March 2006. †

“Natural Theology: Recent Developments, Future Potential”, Cornell University, sponsored by Chesterton House and Graduate Christian Fellowship, Ithaca, NY, March 2006. †

“Reductionism, Development, and Time”, Philosophy of Biology Workshop, sponsored by the University of California-Irvine, Laguna Beach, CA, February 2006. †

“Criteria of Explanatory Adequacy in Disciplinary Syntheses: Revisiting ‘Incommensurability’ in the Context of Evolutionary Developmental Biology”, Dept. of Philosophy, University of Minnesota-Twin Cities, Minneapolis, MN, January 2006. †

“Evolutionary Morphology and Evo-devo: Hierarchy and Novelty”, Bay Area Biosystematists Meeting, University of California-Berkeley, Berkeley, CA, January 2006. †

## 2005

“Comparative embryology and Evo-devo history: Lessons from N.J. Berrill’s embryological investigations of marine invertebrate evolution”, Office for History of Science and Technology, University of California-Berkeley, November 2005. †

“The Structure and Import of Developmental Genetic Explanations of Evolutionary Novelty”, International Society for the History, Philosophy, and Social Studies of Biology, University of Guelph, Guelph, Ontario, July 2005.

“Commentary on ‘Revisiting the Darwinian Revolution’ (Special Issue of the *Journal of the History of Biology*, 2005)”, International Society for the History, Philosophy, and Social Studies of Biology, University of Guelph, Guelph, Ontario, July 2005. †

“Evolutionary Developmental Biology and the Problem of Innovation and Novelty”, Dept. of Philosophy, California State University-Chico, Chico, CA, February 2005. †

“Evolutionary Developmental Biology and the Problem of Innovation and Novelty”, Dept. of Philosophy, University of California-Santa Cruz, Santa Cruz, CA, February 2005. †

“Explaining Innovation and Novelty: A Study on the Nature of Interdisciplinary Epistemology”, Hampshire College, Amherst, MA, February 2005. †

“N.J. Berrill and the evolutionary developmental biology of ascidians”, Division of Humanities, California Institute of

Technology, Pasadena, CA, February 2005. †

“Evolutionary Developmental Biology and the Problem of Innovation and Novelty”, School of Life Sciences, Arizona State University, Tempe, AZ, February 2005. †

“Evolutionary Developmental Biology and the Problem of Innovation and Novelty”, Dept. of Philosophy, University of Chicago, Chicago, IL, January 2005. †

#### 2004

“Problem Agendas in Biological Research: The Case of Evolutionary Innovation and Novelty”, Dept. of Philosophy, University of Missouri-Columbia, Columbia, MO, December 2004. †

“Problem Agendas in Biological Research: The Case of Evolutionary Innovation and Novelty”, Dept. of Philosophy, University of California-San Diego, San Diego, CA, October 2004. †

“Larval Homology, Ectoderm Novelty, and Skeletal Arm Morphogenesis in the Sea Urchin Genus *Heliocidaris*”, Dept. of Biology, Indiana University, IN, April 2004.

“Problem Agendas in Biological Research: The Case of Evolutionary Innovation and Novelty”, Dept. of History and Philosophy of Science, Indiana University, Bloomington, IN, February 2004. †

“Problem Agendas in Biological Research: The Case of Evolutionary Innovation and Novelty”, Division of History and Philosophy of Science, Notre Dame University, South Bend, IN, January 2004. †

#### 2003

“Organizational Homology, Sea Urchin Larvae, and Ectoderm Novelty”, Philosophy and Developmental Biology Workshop, Cambridge, MA, November 2003.

“N.J. Berrill and the evolutionary developmental biology of ascidians”, History of Science Society Meeting 2003, Cambridge, MA, November 2003.

“Evaluating Larval Homologies in Closely Related Species with Different Developmental Modes” (Scientific Poster Presentation), Developmental Basis of Evolutionary Change, University of Chicago, Chicago, IL, October 2003.

“The Problem of Innovation and Novelty”, International Society for the History, Philosophy, and Social Studies of Biology, University of Vienna, Vienna, Austria, July 2003.

“Morphological and Paleontological Perspectives for a History of Evo-Devo”, Evolutionary Morphology Group, University of Chicago, Chicago, IL, May 2003. †

“Concepts and Conceptual Change: A Hybrid Investigative Framework for Philosophy of Science”, Workshop on Cultural Evolution, University of Chicago, Chicago, IL, May 2003. †

#### 2002

“Evolvability, Dispositions, and Intrinsicity”, Philosophy of Science Association Meeting 2002, Milwaukee, WI, November 2002.

“Alternate Histories for Evo-Devo: Morphological and Paleontological Perspectives”, Dibner Institute for the History of Science Workshop, “From Embryology to Evo-Devo”, Cambridge, MA, October 2002. †

“Evolvability, Dispositions, and Intrinsicity”, 1<sup>st</sup> Annual Conference on Recent Work in Biology and Philosophy, Duke University, June 2002.

“Comments on Mensemer (‘Explaining Patterns of Stasis and Change in Kingdom *Animalia*: Developmental Constraints,

Evo-devo, and Devo-evo’)", Philosophy and Developmental Biology Workshop, University of Texas-Austin, April 2002. †

“Evolutionary Morphology, Innovation, and the Synthesis of Evolutionary and Developmental Biology”, Philosophy of Biology Graduate Student Conference, University of Texas-Austin, April 2002.

“Causal Process Individuation, Contrastive Explanation, and Theoretical Generality. Comments on Brandon’s “The difference between drift and selection: A reply to Millstein”, Philosophy and History of Biology Workshop, University of Pittsburgh, March 2002.

### 2001

“Evolutionary Morphology, Innovation, and the Synthesis of Evolutionary and Developmental Biology”, Pittsburgh/London Colloquium on Philosophy of Biology and Neuroscience, University of London, London, UK, September, 2001.

### 2000

“Darwin and *Cirripedia* Prior to 1846”, Joint Atlantic Seminar on the History of Biology, Princeton University, Princeton, NJ, April, 2000.

### OTHER CONFERENCE PARTICIPATION († = invited)

“Origins of Life”, The Seven Pines Symposium XV, Stillwater, MN, May 2011. †

Workshop Participant in “Philosophical Perspectives on Causal Reasoning in Biology”, Minnesota Center for Philosophy of Science, University of Minnesota, MN, May 2011. †

Session Chair for “Philosophy of Biology”, American Philosophical Association – Central Division Meeting, Minneapolis, MN, March 2011. †

Discussant for “Debating Darwin: Philosophical Issues in Evolution and Natural Selection”, University of California – Santa Barbara, CA, February 2011. †

Workshop Organizer for “Conceptual Change in Biological Science: Evolutionary Developmental Biology, 1981-2011”, Max Planck Institute for the History of Science, Dahlem, Berlin, July 2010.

Session Chair for “Genomic Programs as Mechanism Schemas: A Non-Reductionist Interpretation”, Philosophy of Biology at Madison (POBAM), University of Wisconsin–Madison, May 2010. †

Symposium Co-organizer for “Genetics and Religion: Prospects for Dialogue”, University of Minnesota, Minneapolis, MN, September 2009.

Session Chair for “Information and Function”, International Society for the History, Philosophy, and Social Studies of Biology, University of Queensland, Brisbane, Australia, July 2009. †

Session Organizer for “Probing the Philosophical Consequences of Experimental Practices in Developmental Biology”, Society for the Philosophy of Science in Practice, University of Minnesota, Minneapolis, MN, June 2009.

“Emergence: From Physics to Biology”, The Seven Pines Symposium XI, Stillwater, MN, May 2007. †

Session Chair for “Scientific Practice, Conceptual Change, and the Nature of Concepts”, Concepts and Objectivity: Knowledge, Science, and Values, University of Pittsburgh, September 2006. †

Panel Discussion Chair for “Methods and Approaches to Biology”, Southwest Colloquium on the History and Philosophy of Life Sciences, UC-Davis, April 2006. †

“Shifting Pasts: Four Dialogues on Change”, Second German-American Frontiers of Humanities Symposium, Hamburg, Germany, October 2005. †

“Concept of the Gene in Contemporary Biology” Workshop, University of Pittsburgh, January 2003. †

“From Embryology to Evo-Devo”, Dibner Institute Seminar on the History of Biology, Woods Hole, MA, May/June 2001.

## PROFESSIONAL AFFILIATIONS

American Philosophical Association; History of Science Society; International Society for the History of Philosophy of Science; International Society for the History, Philosophy, and Social Studies of Biology; National Association of Biology Teachers; National Association of Scholars; Philosophy of Science Association; Society for Integrative and Comparative Biology; Society for the Philosophy of Science in Practice

## SERVICE

### *Institutional*

CLA Undergraduate Freshmen Scholarship Reviewer (2011); CLA Undergraduate Continuing Scholarship Reviewer (2010); CLA College Day (2010); CLA Undergraduate Continuing Scholarship Reviewer (2009); CLA Course Review Committee (2009–); CLA College Day (2009); CLA Undergraduate Continuing Scholarship Reviewer (2009); CLA Faculty Calling Outreach (2009); CLA Freshmen Research Award Faculty Participant (2008-2009); CLA Undergraduate Continuing Scholarship Reviewer (2008); CLA ‘Sneak Preview’ for prospective students (2007)

Internal Affiliations: Minnesota Center for Philosophy of Science; Studies of Science and Technology Program; Conceptual Foundations in Evolutionary Biology Interdisciplinary Graduate Group; Religious Studies (Affiliate Faculty)

### *Departmental*

Website Coordinator (2009–); Colloquium Committee (2009); Standing Search Committee (Fall 2008–); Admission and Aid Committee (2008); Departmental Planning Committee (2008); Woodbridge Scholarship Award Committee (2007); Colloquium Committee (2007)

### *Professional*

Founding editor of *Philosophy & Theory in Biology* (online, open-access, peer-reviewed journal - <http://quod.lib.umich.edu/p/ptb/>) with Massimo Pigliucci (CUNY-Lehman), Jonathan Kaplan (Oregon State University), and Joan Roughgarden (Stanford University), 2009–

&HPS – Integrated History and Philosophy of Science Steering Committee, 2009–

*Metascience* Editorial Board, 2010–

### \*Referee / Reviewer

(2011) *Biology & Philosophy*, *Evolution & Development*, John Templeton Foundation, *Journal of Experimental Zoology (Molecular Developmental Evolution)*, *Philosophy of Science* (2x), *Science & Education* (2x)

(2010): *Biology & Philosophy*, *British Journal for Philosophy of Science*, Canada Research Chairs Program – College of Reviewers, *Erkenntnis*, *Evolution & Development*, Konrad Lorenz Institute for Evolution & Cognition Research, *Philosophy of Science* (2x), *Psychology Research and Behavioral Management*

(2009): *Acta Biotheoretica* (2x), *BioScience*, *Erkenntnis*, *Philosophy of Science* (2x)

(2008): Oxford University Press (2x); Springer; National Science Foundation (Frontiers in Integrative Biological Research); Western Canadian Philosophical Association; *Erkenntnis*

(2007): *Biology & Philosophy*; *The Quarterly Review of Biology*; *International Studies in the Philosophy of Science*; *Philosophy of Science* (2x)

(2006): National Science Foundation (Science and Society Division); MIT Press; *BioScience*; *Heredity*; *Journal of Experimental Zoology (Molecular Developmental Evolution)*

(2005): *Journal of the History of Biology*; Stanford Encyclopedia of Philosophy; *Journal of Experimental Zoology (Molecular Developmental Evolution)* (2x)

(2004): *Journal of Experimental Zoology (Molecular Developmental Evolution)*

#### **Other**

Pitt/CMU Graduate Conference Referee: 1998, 2002; Co-organizer of the History and Philosophy of Science and Mathematics Seminar Series (2005-6; sponsored by the Institute for Humanities Research, UCSC); Faculty of Arts and Sciences Graduate Student Representative for HPS Department, 1999-2001; Graduate Student Representative for HPS departmental meetings, 1999-2002; Instructor for Teaching Assistant Orientation and Training - Center for Instructional Development and Distance Education: (1) 2000: "Getting Started in the Classroom" & "Creating an Inclusive Classroom"; (2) 2001: "The 50-Minute Lecture"; (3) 2001: "Getting Started in the Classroom"

### **TEACHING EXPERIENCE (summary only)**

#### ***University of Minnesota***

Fall 2010 – Co-instructor for undergraduate course "Philosophy of the Biological Sciences"

Spring 2010 – Co-instructor for faculty seminar "Corporeal Epistemologies: Body and Knowing Across the Disciplines" (Institute for Advanced Study)

Fall 2009 – Instructor for undergraduate course "Science, Technology, and Society: Darwin and Design"

Fall 2009 – Instructor for undergraduate course "Scientific Reasoning"

Fall 2008 – Instructor for undergraduate course "Science, Technology, and Society: Darwin and Design"

Fall 2008 – Instructor for undergraduate course "Scientific Reasoning"

Spring 2008 – Instructor for undergraduate/graduate course "19<sup>th</sup> Century Philosophy of Science"

Spring 2008 – Instructor for undergraduate course "Fossils and Philosophy: Historical Knowledge"

Fall 2007 – Instructor for undergraduate course "Science, Technology, and Society: Darwin and Design"

Fall 2007 – Instructor for undergraduate course "Scientific Reasoning"

Spring 2007 – Instructor for undergraduate course "Philosophy of the Biological Sciences"

Spring 2007 – Instructor for undergraduate course "Scientific Reasoning"

Fall 2006 – Instructor for graduate seminar "Reductionism in Biology"

#### ***UC Santa Cruz***

Spring 2006 – Instructor for undergraduate course "Philosophy of Biology"

Spring 2006 – Instructor for undergraduate course "Introduction to Logic"

Winter 2006 – Instructor for undergraduate course "Nature of Science: Introduction to Philosophy of Science"

Fall 2005 – Instructor for undergraduate course "Philosophy of Science: Darwin and Design"

#### ***Indiana University, Bloomington***

Spring 2004 – Associate Instructor for the undergraduate course "Evolution"

Instructor: Rudolf Raff

Fall 2003 – Associate Instructor for the undergraduate course "Evolution and Diversity"

Instructor: Michael Wade

Spring 2003 – Inquiry Curriculum Enhancement Team, HHMI grant, Dept. of Biology, Indiana University: designed, implemented, and assessed the effectiveness of novel teaching modules in the discussion section curriculum of the introductory lecture course "Evolution and Diversity"

Fall 2002 – Inquiry Curriculum Enhancement Team (as above)

#### ***University of Pittsburgh***

Summer 2002 – Independent Instructor for undergraduate course "Darwinism and its Critics"

Summer 2001 – Independent Instructor for undergraduate course "Darwinism and its Critics"

Spring 2000 – Independent Instructor for undergraduate course "Myth and Science"

Summer 1999 – Independent Instructor for undergraduate course "Problem Solving"

Spring 1999 – Teaching Assistant for undergraduate course "Einstein for Everyone"

Instructor: John Norton

Fall 1998 – Teaching Assistant for undergraduate course "Thinking about the Environment"

Instructor: Bruce Glymour

### ***Guest Lectures***

- May 2011 – “Darwin’s Functional Reasoning”, delivered at the Minneapolis College of Art and Design for the undergraduate course “Reading and Writing 2”  
*Primary Instructor:* Neal Jahren, PhD, Biochemistry, Molecular Biology and Biophysics
- March 2011 – “Interdisciplinary Lessons for the Teaching of Biology from the Practice of Evo-devo”, delivered at the STEM (Science, Technology, Engineering, and Mathematics) Education Center, University of Minnesota
- February 2011 – Panel discussant (with Lynn Nyhart and Ronald Numbers) for the movie *Creation: The True Story of Charles Darwin*, “Darwin Day 2011”, University of Wisconsin – Madison
- February 2010 – “Famous Thinkers Change Their Mind (With Subtlety): The Case of Charles Darwin and Asa Gray”, delivered at the “Darwin Day” event for the Campus Atheists and Secular Humanists (CASH)
- February 2010 – “Understanding Biological Reasoning: Concepts, Explanations, & Interdisciplinarity”, delivered to the Osher Lifelong Learning Institute for the series ‘Afternoon with the Liberal Arts’
- March 2008 – “Interdisciplinarity in Philosophical Perspective”, delivered at the University of Minnesota for the NSF Integrative Graduate Education and Research Traineeship (IGERT) graduate seminar  
*Primary Instructor:* Claudia Neuhauser, PhD, Ecology and Evolutionary Biology
- April 2007 – “Temporality in Explanations of Ontogeny: Making the Continuous Discrete”, delivered at the University of Minnesota for the graduate seminar “Matters of Time”  
*Primary Instructors:* David Fox, PhD, Geology and Geophysics; Sally Kohlstedt, PhD, History of Science and Technology; Ann Waltner, PhD, History
- September 2006 – “Science and Theology in History”, delivered at the University of Minnesota for the undergraduate course “Origins”  
*Primary Instructor:* Chris Macosko, PhD, Chemical Engineering and Materials Science
- February 2004 – “Homology: How Can We Trace Evolutionary History with Structure?”, delivered at Indiana University for the undergraduate course “Evolution”  
*Primary Instructor:* Rudolf Raff, PhD, Biology
- March 2002/2001/2000 – “Darwinism and Christianity”, delivered at Carnegie Mellon University for the undergraduate course “Christianity and Science”  
*Primary Instructor:* Gary Patterson, PhD, Physical Chemistry
- March 2002 – “Charles Lyell, Geology, and Darwin”, delivered at the University of Pittsburgh for the undergraduate course “Darwinism and its Critics”  
*Primary Instructor:* James G. Lennox, PhD, History and Philosophy of Science

### ***Graduate Student and Senior Project Supervision***

- Spring 2011– 2 Senior Projects Supervised (both Honors Theses)
- Spring 2011 – M.A. exam committee member for Patrick Norton
- Fall 2010 – 2 Senior Projects Supervised
- Fall 2010 – Three-paper exam committee member for Will Bausman
- Fall 2010 – Three-paper exam committee member for Patrick Norton
- Summer 2010 – Dissertation committee member (reader) for Deepanwita Dasgupta
- Summer 2010 – Departmental Research Partnership Program Supervisor for Leia Rollag
- Spring 2010 – Thesis proposal committee member (co-advisor) for Tom Doyle
- Spring 2010 – Thesis proposal committee member for Joe Martin (HSTM)
- Fall 2009 – Preliminary examination committee for Joe Martin (HSTM)
- Fall 2009 – Thesis proposal committee member for Mark Herr

Fall 2009 – Thesis proposal committee member for Maran Wolston  
Fall 2009 – Three-paper exam committee member for Marisol Brito  
Summer 2009 – Preliminary examination committee for Nathan Crowe (HSTM)  
Fall 2008 – Thesis proposal committee member for Anastasia Panagopoulos  
Fall 2008 – 1 Senior Project Supervised  
Fall 2008 – Three-paper exam committee member for Marisol Brito  
Summer 2008 – Dissertation committee member (reader) for Barton Moffatt  
Summer 2008 – Graduate Research Partnership Program Supervisor for Tom Doyle  
Spring 2008 – 3 Senior Projects Supervised  
Fall 2007 – Directed study with Nathan Crowe on “Darwin and Design”  
Spring 2007 – 5 Senior Projects Supervised  
Fall 2006 – Dissertation committee member (reader) for Toben LaFrancois  
Fall 2006/Spring 2007 – Three-paper exam committee member for Jessica Slind  
Winter 2006 – Directed study with Robert Harada on “Theories of Scientific Progress” [UCSC]  
Fall 2005/Winter 2006 – Qualifying exam committee member for Zachary Fruhling [UCSC]

### REFERENCES

- **Paul E. Griffiths:** Dept. of Philosophy & Centre for the Foundations of Science, University of Sydney
- **James G. Lennox:** Dept. of History and Philosophy of Science, University of Pittsburgh
- **Sandra D. Mitchell:** Dept. of History and Philosophy of Science, University of Pittsburgh
- **Robert C. Olby:** Dept. of History and Philosophy of Science, University of Pittsburgh
- **Rudolf A. Raff:** Dept. of Biology, Indiana University (Bloomington)
- **Michael J. Wade:** Dept. of Biology, Indiana University (Bloomington)
- **Günter P. Wagner:** Dept. of Ecology and Evolutionary Biology, Yale University
- **C. Kenneth Waters:** Dept. of Philosophy, University of Minnesota
- **William C. Wimsatt:** Dept. of Philosophy, University of Chicago

