



Barrett Anthony Klein

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Education

University of Texas at Austin (UT) The Ant Course	PhD; Ecology, Evolution & Behavior	2003-2010 2004
University of Arizona Organization for Tropical Studies	MS, Entomology	2000-2003 2002
Missouri State University (MSU)	Graduate studies, Biology	1995-1996
Cornell University	BS, Entomology	1989-1993

Employment

Innovative Lecturer, University of Konstanz, Germany		2011-
Visiting scientist Dept. of Neurobiology & Behavior, Cornell University		2011
BEEgroup, University of Würzburg		2010
Educator (see below)		
Freelance scientific illustrator, model maker, & filmmaker		
Sleep lab research assistant: Insomnia treatment studies, Univ. of Arizona		2003
Senior Preparator: Exhibition Dept., American Museum of Natural History (AMNH)		1996-1999
Production & maintenance of natural history exhibits; Scientific & model-making coordination: models for the <i>Hall of Biodiversity</i> & model microorganisms for <i>Epidemic! World of Infectious Disease</i> exhibit		
Model maker, illustrator, & curator of entomology: Chase Studio, Inc., MO		1995-1996

Publications

- Klein BA, Stein J, Taylor RC. (*in prep*) One robot in the service of ethology.
- Klein BA. 2012. The curious connection between insects and dreams. 3:1-17. *Insects*.
doi:10.3390/insects3010001
- Wray MK, Klein BA, Seeley TD. 2011. Honey bees use the social information in waggle dances more fully when foraging errors are more costly. *Behavioral Ecology*.
doi:10.1093/beheco/arr165
- Klein BA, Seeley TD. 2011. Work or sleep? Honeybee foragers opportunistically nap during the day when forage is not available. *Animal Behaviour*. 82:77-83. doi:10.1016/j.anbehav.2011.03.026
Science News: www.sciencenews.org/view/generic/id/74425/title/News_in_Brief_Life__
- Taylor RC, Klein BA, Stein J, Ryan MJ. 2011. Multimodal signal variation in space and time: how important is matching a signal with its signaler? *Journal of Experimental Biology*. 214:815-820.
doi:10.1242/jeb.043638
Featured on cover
- Taylor RC, Klein BA, Ryan MJ. 2011. Inter-signal interaction and uncertain information in anuran multimodal signals. *Current Zoology*. 57:153-161.
Featured on cover
- Monto G, Klein BA. 2011. In conversation: Barrett Anthony Klein. *Current Science*. 100:16-18.
- Abbott JC. 2011. Illustrated by Klein BA. *Damselflies of Texas*. University of Texas Press.
- Klein BA, Klein A, Wray MK, Mueller UG, Seeley TD. 2010. Sleep Deprivation impairs precision of waggle dance signaling in honey bees. *Proceedings of the National Academy*

- of Sciences, U.S.A. 107:22705-22709. doi:10.1073/pnas.1009439108
Science podcast: www.scienceupdate.com/show.php?date=20110103
NatureNews: www.nature.com/news/2010/101213/full/news.2010.672.html
NewScientist: www.newscientist.com/article/dn19864-sleepy-bees-slur-their-waggle-dance-moves.html
Journal of Experimental Biology: Cadena. 2011. Sleepless nights... 214:iv.
- Klein BA**, Olzowy KM, Klein A, Saunders KM, Seeley TD. 2008. Caste-dependent sleep of worker honey bees. *Journal of Experimental Biology*. 211:3028-3040. doi:10.1242/jeb.017426
Media coverage: Deutsches Bienen Journal, Dec. 2008.
- Wray MK, **Klein BA**, Mattila HR, Seeley TD. 2008. Honeybees do not reject dances for 'implausible' locations: reconsidering the evidence for cognitive maps in insects. *Animal Behaviour*. 76:261-269. doi:10.1016/j.anbehav.2008.04.005
Media coverage: NatureNews, 24 Jun. 2008.
- Taylor RC, **Klein BA**, Stein J, Ryan MJ. 2008. Faux frogs: Multimodal signalling and the value of robotics in the study of animal behaviour. *Animal Behaviour*. 76:1089-1097. doi:10.1016/j.anbehav.2008.01.031
Media coverage: NewScientist.com, www.youtube.com/watch?v=OYrVugWRQsA
- Klein BA**. 2007. Insects in Art. In: *Encyclopedia of Human-Animal Relationships: A Global Exploration of Our Connections with Animals*. Bekoff, M., ed. Greenwood Press, Westport, CT, USA. 1:92-99.
- Klein BA**, Bukowski TC, Avilés L. 2005. Male residency and mating patterns in a subsocial spider. *Journal of Arachnology*. 33:703-710. doi:10.1636/S03-62.1
- Klein BA**. 2003. Signatures of sleep in the paper wasp *Polistes flavus*. Master's thesis, Univ. of Arizona. Tucson, AZ, USA.
Media coverage: ScienceNOW, 7 Aug. 2002.
- Klein BA**. 2003. Par for the palette: Insects and arachnids as art media. In: *Insects in Oral Literature and Traditions*. Motte-Florac, E. and J.M.C. Thomas, eds. Peeters, Paris, France.
- Bernays EA, **Klein BA**. 2002. Quantifying the symbiont contribution to essential amino acids in aphids: the importance of tryptophan for *Uroleucon ambrosiae*. *Physiological Entomology*. 27:275-284. doi:10.1046/j.1365-3032.2002.00297.x
- Engel MS, **Klein BA**. 1997. *Neocorynurella*, a new genus of Augochlorine bees from South America (Hymenoptera: Halictidae). *Deutsche Entomologische Zeitschrift*. 44:155-163.

Journal SLEEP abstracts:

- Klein BA**, Stiegler MS, Klein AT, Tautz J. 2008. Mapping sleep across a society: Spatial and temporal analysis of worker honey bee sleep. *SLEEP*. 31:A31-A32.
- Klein BA**, Seeley TD. 2007. Work schedules impact sleep schedules in foraging honey bees. *SLEEP*. 30:A38.
- Klein BA**. 2006. Caste-dependent change in the sleep of a worker honey bee. *SLEEP*. 29:A32.
- Klein BA**. 2003. Signatures of sleep in a paper wasp. *SLEEP*. 26:A115-A116.

Presentations

Scientific meetings:

- Klein BA**, Seeley TD. 2011. The graphical display of animal behaviour. Deutsche Zoologische Gesellschaft, Saarbrücken, Germany.
- Klein BA**, Klein A, Wray MK, Mueller UG, Seeley TD. 2010. Sleep deprivation impairs precision of waggle dance signaling in honey bees. International Union for the Study of Social Insects (IUSSI), Copenhagen, Denmark.
- Klein BA**, Stiegler MS, Klein A, Tautz J. 2009/2008. Mapping sleep across a society: Spatial and temporal analysis of worker honey bee sleep. Sleep in Non-Mammalian Models conference, Janelia Farm, VA, USA. Entomological Society of America. Reno, NV & Indianapolis, IN, USA.

- Sleep Research Society, Baltimore, MD, USA.
- Klein BA, Seeley TD.** 2007. Work schedules impact sleep schedules in foraging honey bees. Sleep Research Society, Minneapolis, MN, USA.
- Klein BA, Seeley TD.** 2006. Temporal availability of food resources affects sleep schedules of honey bees. Entomological Society of America. Indianapolis, IN, USA.
- Klein BA.** 2006. Caste-dependent sleep of worker honey bees. IUSSI. Washington D.C., USA. Sleep Research Society of America. Salt Lake City, UT, USA.
- Klein BA.** 2005. Sleep in a society of honey bees. Entomological Society of America. Fort Lauderdale, FL, USA.
- Klein BA.** 2005. Experimental art: esthetics uncovered in the science of entomology. Entomological Society of America (cultural entomology symposium). Fort Lauderdale, FL, USA.
- Klein BA.** 2004. Hitchhiking: Dynamics of leaf-riding in tropical leaf-cutter ants. IUSSI, North American Section. Camp Tontozona, AZ, USA.
- Klein BA.** 2003. Signatures of sleep in a paper wasp. Entomological Society of America. Cincinnati, OH, USA. Associated Professional Sleep Societies. Chicago, IL, USA.
- Klein BA.** 2003. Fabricating insects: the unnatural history of insects on display. Entomological Society of America (cultural entomology symposium). Cincinnati, OH, USA.
- Klein BA.** 2003. Depriving an insect of sleep. Entomological Society of America, Pacific Branch. Tucson, AZ, USA.
- Klein BA.** 2002. Quiescent paper wasps. Ecological Society of America. Tucson, AZ, USA.
- Klein BA.** 2000. Male residency and mating patterns in a subsocial spider. HexaPodium, Tucson, AZ, USA.
- Klein BA.** 2000. Insects and arachnids as art media. 1st International Symposium: Insects in Oral Literature and Traditions. Villejuif, France.

Invited talks:

- Insect esthetics and the importance of imagery in entomology. Plenary address, Joint meeting: Entom. Soc. of Canada & Acadian Entom. Soc., Halifax, Canada (2011)
- Sleeping in a society.
 Smithsonian Institute (2011)
 University of Konstanz, Germany (2010)
 University of Lausanne, Switzerland (2010)
 Indian Institute of Science, Bengaluru, India (2010) www.ias.ac.in/curresci/contents.htm
- Visualizing nature.
 Srishti School of Art, Design and Technology, Bengaluru, India (2010)
 Centre for the Study of Culture and Society, Bengaluru, India (2010)
 Center for the Study of Science, Technology, and Policy (CSTEP), Bengaluru, India (2010)
- Cultural entomology.
 Smithsonian Institute, Washington D.C. (2011)
 University of Konstanz, Germany (2010)
- Sleep deprivation. Rice University, Houston, TX, USA (2009)
- Mapping sleep in honey bees. University of Copenhagen, Denmark (2009)
- Alternate careers for biologists. Salisbury University, Maryland, USA (2009)
- Insects and folk art. Austin Friends of Folk Art, TX, USA (2009)
- Tropical biodiversity and stories of science. Santa Cruz Museum of Natural History, CA, USA (2008)
- Robotic frogs and sleeping bees. University of Berne, Switzerland (2008)
- Investigating the role of sleep in honey bees.
 University of Zurich, Switzerland (2008)
 UC Berkeley, CA, USA (2007)

Freie Universität Berlin, Germany (2007)
Indiana State University, Terre Haute, IN, USA (2006)
Max Planck Institute, Andechs, Germany. (2006)
Sleep Research Society (trainee symposium), Salt Lake City, UT, USA (2006)
Fabricating insects: the unnatural history of insects on display. Turtle Bay Exploration Park, Redding, CA, USA (2005)
Storytelling and role-playing. AMNH teachers' symposia, NY, USA (1998)
Science and art in the museum.
Career Day, University of Arizona, Tucson, AZ, USA (2001)
Arizona Entomological Society, Tucson, AZ, USA (2001)
Insects in art. New York Entomological Society, NY, USA (1998)
Art and science. Ricks College, Rexburg, ID, USA (1996)

Professional activities

Scientific consultation:

BBC, *Invisible Worlds* television production (2009)
American Museum of Natural History, *Dinosaurs: Ancient Fossils, New Discoveries* exhibit (2004)
Lyman, F. 1998. Inside the Dzanga-Sangha Rain Forest. Workman, NY
BBC & Smithsonian Tropical Research Institute, Panama (1993)

Reviews:

Proposals: National Science Foundation (USA), National Research Foundation (South Africa)
Journals: Apidologie, Behavioral Ecology, PLoS ONE

Committees:

Search committee, UT: Animal Behavior assistant professor position (2008)

Educator

Mentorship/supervision:

Master's (Schriftliche Hausarbeit) thesis, Martin Stiegler, Univ. Würzburg, Germany (2006-2007)
Undergrads: 20 students at Univ. of AZ, Cranberry Lake Biol. Station, Univ. of Würzburg, UT, Cornell

Course design & lecture:

Visual impact: the use and abuse of visual information, Univ. Konstanz, Germany (2011-2012)
Creating visuals for scientific publication, Max Planck Institute, Seewiesen, Germany (2011)

Graduate teaching assistance:

Invertebrate Zoology: UT (spring 2009, 2008)
Entomology: UT (fall 2008, 2007, 2006, 2004, and spring 2009, 2006)
Animal Behavior: Cranberry Lake Biol. Station, NY (spring 2006); Univ. of Arizona (fall 2001, 2000)
Aquatic Entomology: UT (fall 2005)
Field Biology: UT (spring 2004)
Teaching Biology: Univ. of Arizona (fall 2002)

Guest teaching:

Production of Knowledge in the Natural and Social Sciences course, Centre for Contemporary Studies, Indian Institute of Science, Bengaluru, India (2010)

Media coverage: Current Science, www.ias.ac.in/currsci/contents.htm

Behavioral biology course: Univ. Würzburg, Germany (2010)

Teacher training course: Salisbury Univ., MD (2009)

Comparative Physiology course: UT (2009)

UT SAGE (Seminars for Adult Growth and Enrichment) (2008)

Sleep course: Univ. of Arizona (2003)

Desert Biota courses: MSU, held in Southwestern USA

Southwest desert course: Western Washington Univ. (2000)

Animal Drawing course: AMNH (1999)

K-12 teaching:

GK-12 Fellow, Covington Middle School, Austin, TX (spring 2005)

www.esi.utexas.edu/k-12-a-the-community/gk-12-program/137-gk-12-past-participants

Inquiry-based educator, Content through Inquiry Project, Tucson, AZ schools (2001)

High school educator, AMNH Education Dept. courses (1998-1999):

Insects in art & history; Ant magnified—insects and art; Molding & casting

Public outreach:

SLEEP. Science Under the Stars lecture series, Brackenridge Field Lab, Austin, TX (2009)

Storytelling and role-playing workshop: Turtle Bay Exploration Park, Redding, CA (2005)

Development of ant identification key: www.sbs.utexas.edu/Muelleru/AntOutreach/index.html (2003)

Resource guide/lecturer: expedition of Peruvian Amazon (International Expeditions/AMNH, 2000)

AMNH tours: school groups, teachers, trustees, visiting scientists (1997-1999)

History of natural history museums (lectures): The World Financial Center, NY (1998)

Making microbes with the masses workshop: AMNH (1998)

Today Show (ABC): AMNH *Hall of Biodiversity* (1998)

Science videos:

Infrared videography of honey bees for the BBC series “Invisible Worlds” (2009)

Termite communication: www.youtube.com/watch?v=PcpdXtw7PvA (2008)

Ant dissection: www.youtube.com/watch?v=j3zgj3pnRN8 (2005)

Cultural entomology:

India Institute of Science, Bengaluru, India (2010)

Wild Basin Nature Ctr., Austin, TX (2007)

Bob Bullock Museum, Austin, TX (2004)

Entomophagy lecture & feast: Watermargin Cooperative, Cornell Univ. (1993)

Insect presentations, tours:

School groups, K-12 (AZ, MA, MD, MI, MO, Newark Museum middle school, NY, TX)

Explore UT: university-wide open house, Austin, TX (2005)

Zen Center of New York City (1998)

Earth Watch: Barro Colorado Island, Panama (1993)

Radio:

Science podcast (2010)

“The Awkward Off”, KVRX, Austin, TX (2009)

Modern rock radio station “Bug Guy” appearances: Springfield, MO (1996)

Art

Illustrations/models in scientific publications:

Mueller, U.G. et al. (*in prep.*) Fungus Growing Ants of the United States.

Abbott, J.C. 2011. Illustrated by B.A. Klein. *Damselflies of Texas*. University of Texas Press.

Loiácono, M. and C. Margaría. 2010. *Insectos y hombres: una diversidad de interacciones*. Argentina.

Rabeling, C., J. M. Brown and M. Verhaagh. 2008. Newly discovered sister lineage sheds light on early ant evolution. *PNAS*. 105:14913-14917.

Rittschof, C. C. and T. D. Seeley. 2008. The buzz-run: how honey bees signal ‘Time to go!’ *Animal Behaviour*. 75:189-197.

Moczek, A.P. 2007. Developmental plasticity and the origins of diversity: a case study on horned beetles.

In: Phenotypic plasticity in insects: mechanisms and consequences. Edited by: T.N. Ananthakrishnan and D. Whitman. Science Publishers, Inc. Plymouth, UK.

Mueller, U.G., N.M. Gerardo, D.K. Aanen, D.L. Six and T.R. Schultz. 2005. The evolution of agriculture in insects. *Annual Review of Ecology, Evolution, and Systematics*.

Moczek, A.P. 2005. The evolution and development of novel traits, or how beetles got their horns. *Bioscience*. 55:937-951.

- Roubik, D.W. 2004. Sibling species among *Glossura* and *Glossuropoda* in the Amazon region (Hymenoptera; Apidae: Euglossini). *Journal of the Kansas Entomological Society*. 77:235-253.
- Roubik, D.W. and P.E. Hanson. 2004. Orchid bees of tropical America: Biology and field guide. InBio Press, Heredia, Costa Rica.
- Solomon, S.E., et al. 2004. Nesting biology of the fungus growing ants *Mycetarotes* Emery (Attini, Formicidae). *Insectes Sociaux*. 51:333-338.
- Engel, M.S. 2000. Classification of the bee tribe Augochlorini (Hymenoptera: Halictidae). *Bulletin of the American Museum of Natural History*. 250:4-89.
- Ward, B. 2000. Eyewitness Books: Epidemic. Dorling Kindersley Publ., Inc. New York, NY.
- DeSalle, R., ed. 1999. Epidemic! World of Infectious Disease. The New Press. New York, NY.
- Lyman, F. 1998. Inside the Dzanga-Sangha Rain Forest. Workman Publ. New York, NY.
- Conway, G., et al. 1997. Jak1 kinase is required for cell migrations and anterior specification in zebrafish embryos. *Proceedings of the National Academy of Sciences USA*. 94:3082-3087.
- Seeley, T.D. 1996. *Wisdom of the Hive: the Social Physiology of Honey Bee Colonies*. Harvard Univ. Press. Cambridge, MA. (*adapted from original*)
- Vance, S.A. 1996. Morphological and behavioural sex reversal in mermithid-infected mayflies. *Proceedings of the Royal Society of London Series B-Biological Sciences*. 263:907-912.
- Conway, G. 1995. A novel gene expressed during zebrafish gastrulation identified by differential RNA display. *Mechanisms of Development*. 52:383-391.

Gallery and art museum exhibits:

- Engaging Insects*: USM Art Gallery, Gorham, Maine (2011)
- Projection of art on bands: *Boy with a Fish* (Ithaca Festival, NY, 2011), *Gorch Fock* (Emo's, Austin, TX, 2004), *Lori Surfer & Co.* (Room 710, 2003)
- Book of Hours*: Arnold Klein Gallery, www.lmstudio.com/BOH/ (2010)
- Entomologia*: Observatory, Proteus Gowanus art complex, Brooklyn, NY (2010)
- Invisible Worlds*: Filmed and edited infrared sequences for BBC program (2009)
- Horizon*: Arnold Klein Gallery, Royal Oak, MI (2009)
- Insects and Art*: Royal Entomological Society, University of Plymouth, UK (2008)
- Dionysium*: Alamo Drafthouse, South Lamar, Austin, TX (2006)
- Art Wing*: Entomological Soc. of America, Fort Lauderdale, FL (2005)
- Numbers*: Arnold Klein Gallery, Royal Oak, MI (2004)
- The Great Insect Fair*: HUB Gallery, PennState Univ. (2002)
- Bugs! A Children's Exhibition of Bugs in Art*: Anchorage Museum of History and Art, AK (2001)
- Mimesis* (Museum of Contemporary Art: Hazmat Gallery, Tucson, AZ (2001)
- Insects and Arachnids as Art Media*: designed and installed showcase exhibit for Univ. of Arizona (2001)
- Earth*: Arnold Klein Gallery, Royal Oak, MI (2001)
- Insectal art*: curated art within HexaPodium scientific meeting, Tucson, AZ (2000)
- Bugs*: Click Gallery, Royal Oak, MI (2000)

Natural history museum exhibits:

- Biology models/sculptures and illustrations featured in museums, including:
- Bronx Zoo, Bronx, NY *Congo Rainforest* permanent exhibit
- American Museum of Natural History, NY, NY
- Hall of Biodiversity* permanent exhibit
- Epidemic! The World of Infectious Disease* traveling exhibit
- Endangered!* temporary exhibit
- Up in Central Park* temporary exhibit
- Royal Tyrrell Museum, Alberta, Canada
- Earthworks, Kansas City, MO
- Living Desert Museum, Palm Desert, CA

Sternberg Museum of Natural History, Hays, KS
Museum of the Rockies, Bozeman, MT
Needles Visitor Center, Canyonlands, UT
Salato Wildlife Education Center, Frankfort, KY
Smithsonian traveling exhibit
Public Museum of Grand Rapids, Grand Rapids, MI

Other art:

AMNH illustrations: *Hall of Biodiversity* activity book, Planetarium & Education Dept. websites
Chicken in a Snowstorm Press collaborations (with Karen Anne Klein)
Logos: Southwestern Association for Biologists meetings, Paperwasp Studio, After Dark Jewelry

Awards

Smithsonian Tropical Research Institute Fellowship (2011)
George C. Eickwort Student Research Award, <http://iussi.cyberbee.net/awards/> (2010)
IUSSE travel award (2010)
George H. Mitchell Award for Excellence in Graduate Research (2009)
University Continuing Fellowship, UT (2009)
Deutscher Akademischer Austauschdienst (DAAD) Fellowship (2008)
Carl Gottfried Hartman Graduate Fellowship (2008)
Ecology, Evolution and Behavior Dept. Travel Fellowship (2008)
Texas Academy of Sciences Student Research Competition Award (2007, 2008)
Teaching Assistant Awards, UT (Entomology: 2005, Invertebrate Zoology: 2008)
National Science Foundation Doctoral Dissertation Improvement Grant (2007)
UTOPIA Grant (2007)
Texas EcoLab grants (2005, 2006, 2007)
Dorothea Bennett Memorial Graduate Research Fellowship awards (2004, 2005, 2007)
Sleep Research Society: Honorable Mention Abstract award (2006)
IUSSE: Honorable Mention poster award (2006)
President's Prize: Honorable Mention, Entomol. Soc. America (2003, 2005, 2006)
Continuing University Tuition Fellowship, UT (2005)
Environmental Science Institute GK-12 Fellowship (2005)
Sleep Research Society Trainee Research Excellence Award (2003)
Mellon Foundation Grant (2002)
National Science Foundation Research Training Grants (2002)
Cornell Arts Grant (1993)

Addendum activities and interests

Scientific illustration and natural history exhibit design and production.
Cultural entomology (insects in all realms, spheres and permutations of human interaction and representation), and the history and art of natural history museums.