

Curriculum Vitae (Aug 2017)

Arathi, H. Seshadri (H.S. Arathi)

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Professional Experience:

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| 2013 – present | Sp. Assistant Professor, Department of Soil and Crop Sciences, Colorado State University, CO |
| 2006 – 2013 | Adj. Assistant Professor, Biology Department, Colorado State University, CO (part-time) |
| 2002-2006 | Assistant Professor, Department of Biology, Adelphi University, NY (moved to Colorado to join spouse at CSU) |
| 2001-2002 | Research Assoc., Department of Ecology and Evolutionary Biology, University of Kansas, Lawrence. “Quantitative genetics of floral size and pollination ecology of <i>Mimulus guttatus</i> ” |
| 1998-2000 | Research Assoc., Department of Entomology, University of Minnesota, St. Paul. “Comparisons of hygienic behavior in genetically diverse colonies of the European honeybee, <i>Apis mellifera</i> ” |
| 1996-1998 | Research Fellow, Centre for Ecological Sciences, Indian Institute of Science. “Algorithms of decision making in Asian honeybee, <i>Apis cerana</i> .” |
| 1991-1996 | Doctoral Student, Centre for Ecological Sciences, Indian Institute of Science. “Social organization in genetically mixed colonies of the primitively eusocial wasp, <i>Ropalidia marginata</i> ” |
| 1988-1991 | Master’s Student, University of Agricultural Sciences. “Proximate causes of ovule and seed abortion in tropical trees” |
| 1984-1988 | BS in Horticulture, University of Agricultural Sciences. |

Research:

(i) Pollinator health, behavior, and pollination ecology (ii) Urban agriculture and pollinator conservation and (ii) Abiotic stress and plant-pollinator interactions

Publications (*Undergraduate student authors):

- 1) H.S. Arathi & O’Brien, C.* 2017. Sustaining native bee diversity and abundance near transgenic canola fields. (*In rev*)
- 2) H.S. Arathi & T.J. Smith*. 2017. Plasticity in reproductive functions under abiotic stress in *Collinsia heterophylla*. (*In rev*)
- 3) Arathi, H.S., Vandever, M., & Cade, B. 2017 Assessing native bee biodiversity in an agriculturally dominated landscape of eastern Colorado: a case of utilizing conservation lands (*In rev.*)
- 4) H.S. Arathi, Bjostad, L., & Bernklau, E. 2017. Determination of nutrient value of pollen – a chemical ecology approach to compare pollen collected by honeybees during and after Canola flowering. (*In rev*)
- 5) R. Jorgensen* & H.S. Arathi 2013 Floral longevity under water stress and variable pollination schedule in *Collinsia heterophylla*. *Ann. Bot.* 112 (5), 821-828
- 6) Mudd, S.J.* & Arathi, H.S. 2012. Image analysis protocol for detecting and counting viable and inviable pollen grains. *J. Plant Studies* 1: 158-167
- 7) H.S. Arathi 2012. A comparison of achene morphology in dandelions growing in urban

- landscape and open meadows. *J. Plant Studies* 1: 40-46
- 8) H.S. Arathi. 2011. Selective embryo abortion in a perennial tree-legume - a case for maternal advantage of reduced seed number per fruit. *J Plant Res.*124: 675-681
 - 9) Quinn C.F., Prins C.N., Gross A.M., Hantzis L., Reynolds R.J.B., Freeman J.L., Yang S.I., Covy P.A., Bañuelos G.S., Pickering I.J., Fakra S.F., Marcus M.A., Arathi H.S., Pilon-Smits E.A.H. 2011. Selenium accumulation in flowers and its effects on pollination. *New Phytol.* 192, 727-737
 - 10) Bedhomme S, Bernasconi G, Koene J, Lankinen A, H.S. Arathi, Michiels, N & Anthes N. 2009. How does breeding system variation modulate sexual antagonism? *Biology Letters.* 5: 717-720
 - 11) Kelly, J.K., Holeski, L.M. & H.S. Arathi. 2008. The genetic correlation between flower size and water use efficiency in Monkeyflowers. *Evol. Ecol. Research.* 10: 147-152
 - 12) Naug, D. & H.S. Arathi. 2007. Sensory bias of honeybees for exaggerated signals and its implications for the evolution of floral displays. *Biology Letters.* 3: 635-637
 - 13) Naug, D. & Arathi, H.S. 2007. Sampling rules used by foraging honey bees to exploit the maximum and explore the alternatives in a reward array. *Animal Cognition.*10:117-124
 - 14) H.S. Arathi, Ho, G. & Spivak, M. 2006. Inefficient task partitioning among non-hygienic honey bees (*Apis mellifera* L.). *Anim. Behav.* 72: 431-438
 - 15) H.S. Arathi & Kelly, J.K. 2004. Corolla morphology facilitates both autogamy and bumble bee pollination in *Mimulus guttatus*. *Int. J. Pl. Sci.* 165: 139-145
 - 16) Kelly, J.K. & H.S. Arathi. 2003. Inbreeding and the genetic variation of floral traits in *Mimulus guttatus*. *Heredity.* 90:77-83
 - 17) H.S. Arathi, Rasch, A. *, Cox, C. & Kelly, J.K. 2002 Autogamy and floral longevity in *Mimulus guttatus*. *Int. J. Pl. Sci.* 163: 567-573
 - 18) H.S. Arathi & Spivak, M. 2001. Influence of colony genotypic composition on the performance of hygienic behaviour in the honey bee (*Apis mellifera* L.). *Anim. Behav.* 62: 57-66.
 - 19) H.S. Arathi, Burns, I. & Spivak, M. 2000. Ethology of hygienic behaviour in the honey bee, *Apis mellifera ligustica*: behavioural repertoire of hygienic bees. *Ethology.* 106: 365-379.
 - 20) H.S. Arathi, K.N. Ganeshaiyah, R. Uma Shaanker & S.G. Hegde. 1999. Seed set in *Pongamia pinnata*. *Am. J. Bot.* 86: 659-662.
 - 21) H.S. Arathi & R. Gadagkar. 1998. Cooperative nest building and brood care by nestmates and non-nestmates in *Ropalidia marginata*: implications for the evolution of eusociality. *Oecologia.* 117: 295-299.
 - 22) H.S. Arathi, M. Shakarad & R. Gadagkar. 1997. Social organisation on experimentally assembled colonies of the primitively eusocial wasp, *Ropalidia marginata*: comparison of introduced and natal wasps. *Insectes Sociaux.* 44: 139-146
 - 23) H.S. Arathi, M. Shakarad & R. Gadagkar. 1997. Factors affecting the acceptance of alien conspecifics onto nests of the primitively eusocial wasp, *Ropalidia marginata*. *J. Ins. Behav.* 10: 343-353.
 - 24) H.S. Arathi, K.N. Ganeshaiyah R. Uma Shaanker & S.G. Hegde, 1996. Factors affecting embryo abortion in *Syzygium cuminii* (L.) Skeels (Myrtaceae). *Int. J. Pl. Sci.* 157: 49-52.

Teaching:

- 2016 Spring - Global Challenges in Plant and Soil Sciences (SOCR 475: 14 students)
2015 Spring - Pollinator management in agroecosystems (SOCR 415: 27 students)

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| 2015 Fall | Sustainable food systems (ECOL 592: team taught: 14 students) |
| 2013 Fall | General Crops (SOGR 100: 62 students. Instructor, lecture and lab) |
| 2006 - 2012 | Basics of Plant Life (BZ 104 – a non-major science course taught during Fall and Spring semesters: 180 to 250 enrolled students) |
| 2006 - 2010 | Biology of Organisms (LIFE 103 – Summer course for Biology majors: 25 enrolled students) |
| 2002-2005 | Experimental Design (BIO 630); Ecological Systems (BIO 614) – Graduate course: 25 students. Sole instructor, lecture and lab) |
| 2002-2005 | Ecology (BIO 234 – For Biology majors: 25-30 students. Sole instructor, lecture and lab) |
| 2004-2005 | Evolution (BIO 220 – For Biology majors: 70 students) |
| 2003-2004 | Community Ecology & Evolution (BIO 625 – Graduate course: 25 students) |
| 2003-2004 | Animal Behavior (BIO260 – For Biology majors: 25-30 students. Instructor, lecture and lab) |
| 2003-2004 | Microbiology (BIO208 – For Nursing majors: 25-30 students. Instructor, lecture and lab) |
| 2002-2003 | Introductory Biology (BIO 111 – For Biology majors: 25-30 students. Instructor, lecture and lab) |

Funded Grants:

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| 2017 | Bayer exploratory grant \$5000 (<i>Funded</i>) – PI |
| 2016 | USDA NIFA Research and Extension Experiential Learning for Undergraduate (REEU) Fellowships Program “Integrative Agroecology and Sustainability Fellows Program” \$280,000 (<i>Funded</i>) – co-PI |
| 2016 | Project Apis m, Healthy Hives 2020 Grant, “Phytochemicals as management tool for sustainable honeybee colony health and productivity” \$95,840 (<i>Funded</i>) – PI |
| 2016 | NAPPC Bee Health Task Force Grant 2016, “Effects of phytochemicals on longevity and pathogen resistance in honeybees” \$10,000 (<i>Funded</i>) – co-PI |
| 2016 – | Colorado Professional Beekeeper’s Association “Honeybee nutritional approach to improve commercial pollination in Colorado” \$10,000/year (<i>Funded</i>) – PI |
| 2016 - 2017 | United States Geological Survey research funds award “Efficacy of pollinator habitats in improving pollinator activity and providing diet diversity to pollinators” \$92,200 (<i>Funded</i>) – PI |
| 2016 – | Plant Select, “Describing insect pollinators on Plant Select varieties for Colorado” \$1,500/year (<i>Funded</i>) – PI |
| 2015 | USDA NRCS Conservation Improvement Grant “Demonstrating the potential of cover crop and forage mixtures to improve soil quality and profitability in water limited regions”: \$999, 995 (<i>Funded</i>) – co-PI |
| 2015 | Biodiversity Working Group “Bee PLUS (Pollinator Landscaping for Urban Sustainability) Workshop award \$3500 (<i>Funded</i>) – PI |
| 2015 | Global Challenges Research Team (GCRT) award, Colorado State University, School of Global Environmental Sustainability (SoGES) “Food Systems Research Group” \$10,000 (<i>Funded</i>) – co-PI |
| 2014 | NAPPC Bee Health Task Force Grant 2014, “How does drought stress related alterations to floral traits and reward profiles in Canola influence honeybee foraging and colony health?” \$9145 (<i>Funded</i>) – PI |
| 2014 | School of Global Environmental Sustainability course development grants “Ecosystem services in agriculture” \$1500 (<i>Funded</i>) |

2013 USDA National Needs Graduate and Post-doctoral Fellowship Grants (NNF) co-Principal Investigator “Integrated Training in Plant Breeding and Agronomy for Improved Water Productivity” (*Funded*) \$220,000 – co-PI

Fellowships:

1997 Animal Behavior Research Fellowship, Animal Behavior Society of USA – “Algorithms of honeybee decision making”
 1991-1996 Indian Institute of Science – Doctoral Research fellowship
 1991 Council for Scientific and Industrial Research-University Grants Commission, India
 1989-1991 Junior Research Fellowship, Department of Science and Technology, India
 1984-1988 Undergraduate Merit Scholarship, University of Agricultural Sciences, India

Awards:

2011 Botanical Society of America Symposium organizer award
 1999 NSF travel award for 26th International Ethological Conference
 1998 NSF travel award for 13th International Congress of the IUSSI
 1997 DST (Department of Science Technology, India) travel award for 25th International Ethological Conference
 1996 DST travel award for 20th International Congress of Entomology

Invited Talks:

2013 University of Neuchatel, Neuchatel, Switzerland “Plant reproductive strategies and mating system evolution under abiotic stress”
 2013 IGNITE Biodiversity presentation on “Pollinator diversity and sustenance of an important ecosystem service” SoGES, CSU
 2013 Gardens of the Spring Creek – “Pollinators in your backyard”
 2012 Gardens on the Spring Creek – Pollinator Week presentation, Fort Collins, CO
 2011 Botanical Society of America Symposium presentation, St. Louis, MO
 2007 Café Botanique Lectures – “Flowers and Insects Entangled Forever” Denver Botanic Garden, Denver, CO
 2005 Colorado State University, Ft. Collins, CO
 2002 Adelphi University, Garden City, NY
 2001 University of Kansas, Lawrence, KS
 2000 Bangalore Association for Science Education (BASE), Bangalore, India.
 1999 University of Minnesota, St. Paul, MN
 1998 13th International Congress of IUSSI, Adelaide, Australia

Extension talks:

Feb 2017 “Phytochemicals and bee nutrition” Denver Mile High Bee Club
 May 2017 “Plant strategies for cross-pollination” Fort Collins Citizen Science training
 June 2017 “Bee health and nutrition” Pollinator Week Event Fort Collins
 June 2017 “Emerald Ash Borer treatment and beneficial insects” Plant Health Conference on Emerging Pests In Colorado
 July 2017 “American Foulbrood and veterinary feed directive” Colorado Professional Beekeepers Association
 Oct-Nov 2016 “Honeybee health and Nutrition” 2 classes for the Beekeeping Mentor workshop, CSU Extension, Salida, CO

June 2016 “Honeybee Nutrition” Colorado Department of Agriculture
July 2016 “Bee health and bee forage” Colorado Professional Beekeepers’ Association
March 2016 “Providing Habitat for Pollinators” Greeley Tree Care workshop
Feb 2016 “Sustainable pollinator management” Denver Mile High Bee Club
June 2015 “Biology and behavior of honeybees” Durango Beekeepers Cooperative, Durango CO
Mar 2015 “Nutritive content of pollen in Canola” Annual meeting of the Mountain High Beekeepers’ Cooperative, Longmont CO
Feb 2014 “On-farm pollinator habitats: initiative for farmer-beekeeper cooperation” Annual meeting of the Mountain High Beekeepers’ cooperative, Longmont CO
Feb 2013 “You’ve got bees! How to create a pollinator-friendly backyard – Gardens of the Spring Creek, Fort Collins, CO
June 2012 “Bugs and bees” – Gardens of the Spring Creek, Fort Collins, CO
Feb 2009 “I spy flowers!!! No...They’re Bugs!!!” – Putnam Science Carnival, Poudre School District, Fort Collins, CO

Synergistic:

Jan 2016 – Executive Committee Member, Global Biodiversity Center, Colorado State University
Jan 2015 Global Challenges Research Team – Food Systems Research Group – co-team leader
Apr 2015 Urban Pollinator monitoring in Denver and Fort Collins – team leader
Apr 2015 Development of research activities and defining ecoregions in Fort Collins, expert adviser, Institute of Built Environment research team
May 2015 Collaborator in the One Health Research team on short value food chains
Mar 2014 “Wetland habitat restoration and pollinators”, Mentoring Elementary students in Ft. Collins and Windsor, CO.

Service:

Expert Content reviewer: Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) 2015 – Thematic assessment of pollinators, pollination and food production

Grant review panel member: National Science Foundation (NSF) proposal review panel 2009, United States Department of Agriculture (USDA NIFA) Proposal review panel 2014, 2015 & 2017, PeGASUS grants for Future Earth.

Thesis reviewer: Pakistan Agricultural University Doctoral thesis

Journal reviewer: Plant Biology, Oecologia, Botany, International Journal of Plant Sciences, American Journal of Botany, Weed Research, Journal of Plant Studies, African Journal of Plant Science, Nordic Journal of Ecology, Apidologie, Behavioral Ecology and Ethology, PLoS ONE.

University duties:

At CSU:

- Departmental Search Committee, Resident Instruction Committee, Executive Committee Member Global Biodiversity Center

At Adelphi University

- Graduate Committee, University General Education Committee, and Faculty Senate

Thesis Advisor:

- **Lisa Mason:** MS (2015 -) – Pollinator diversity in urban areas – a citizen science approach
- **Alison Hogeboom:** (MS 2016 -) – Phytochemicals and their role in pathogen tolerance in honeybees and bumblebees
- **Angela Mei.** (2015) Honors Thesis: “Modulation of dichogamy and timing of autonomous selfing under drought stress in *Collinsia heterophylla*”
- **Rachael Jorgensen** (2012). Honors Thesis: “Stress induced modulation of floral longevity in *Collinsia heterophylla*.”
- **Stephanie Moore** (2005) Honors Thesis: “Effect of intra-specific competition on seed germination in Yellow Monkeyflower, *Mimulus guttatus*.”
- **Lauren Ortiz** (2004) Master’s thesis: “Competition between two subterranean termite species: behavioral analysis of niche overlap.

Thesis Committee member:

- **Brittany Smith:** (M.S. 2018)
- **Rasha Al-akeel:** (Ph.D. 2018 – Monitoring pollen source and its relation to honeybee health)
- **Brian Campbell:** (M.S. 2015 – Selecting drought tolerant genotypes in *Brassica carinata* and *Camelina sativa*)
- **Melaku Mekonnen:** (M.S. 2013 – Root traits of drought tolerant lines of *Brassica napus*)
- **Colin Quinn:** (Ph.D. 2010 – Ecological effects of Selenium hyperaccumulation)

Undergraduate Research Mentoring:

- **Ashley Carlisle** – USDA REEU Summer 2017
- **Victoria Halligan** – Undergraduate Research Fall 2016 to present
- **Conor Kimball** – Undergraduate Research Spring 2016 to present
- **Maggie Schappel**– Undergraduate Research Spring 2016 to present
- **Colton O’Brien** – Undergraduate Research Summer 2014 to present
- **Tabitha Covey** – Undergraduate Research Spring 2016
- **Angela Mei** – Honor’s Undergraduate Research Fall 2012 to 2015 “Plant reproductive functions under abiotic stress.” (Manuscript in preparation)
- **Taylor Logan** – Undergraduate Research Fall 2012 to Fall 2014
- **Tyler Smith** – Undergraduate student from WCNR Fall 2011 to Spring 2014. Project title: “Plant reproductive functions under abiotic stress.” (Manuscript In preparation)
- **Samuel Mudd** – Undergraduate Research Fall 2009 to Spring 2012. Project title: “Stress induced modulation of pollen functions.” 2012 Graduate. (*J. Plant Studies* **1: 158-167**).
- **Rachael Jorgensen** – Spring 2010 to Spring 2012. Honors Thesis: “Stress induced modulation of floral longevity in *Collinsia heterophylla*.” 2012 Graduate (*Annals of Botany: 112(5):821-828*)
- **Alexander Jury** – Undergraduate research student from WCNR, Summer 2011 “Effects of drought stress on yield traits in *Brassica napus* (Canola) in Colorado.” 2012 Graduate
- **Marina Rodriguez** – Freshman Undergraduate from WCNR Fall 2011. Project title: “Effects of drought stress on floral traits in the oilseed crop, *Brassica napus* (Canola) in Colorado.”
- **Felicia Unger** – Undergraduate Research Summer 2010 through Fall 2010. Project title: “Corolla mediated autonomous selfing in *Collinsia heterophylla*.”
- **Jacob Long** – Undergraduate Research Spring 2010. Project title: “Standardization of microscopic techniques for estimating total pollen per flower”

- **Lisa Taber** – Undergraduate Research Fall 2009. Project title: “Effect of drought stress on ovule number and seed set”