

Diane R. Campbell - CV

CURRICULUM VITAE

DIANE R. CAMPBELL

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EDUCATION AND EMPLOYMENT

1997-present Full Professor, University of California, Irvine
1993-1997 Associate Professor, UC Irvine
1989-1993 Assistant Professor, Department of Ecology and Evolutionary Biology, UC Irvine
1984-1989 Assistant Professor, Department of Biology, University of Virginia
1983-1984 Postdoctoral Scholar, Department of Biology, University of California, Riverside
1977-1983 Duke University, Ph.D. in Zoology with minor in Mathematical Statistics
1973-1977 Stanford University, B.S. in Biology with Distinction

ACADEMIC AWARDS and RESEARCH GRANTS

2014 Fulbright Senior Specialist in Environmental Sciences, University of Kwazulu-Natal, South Africa.

2013 Rocky Mountain Biological Laboratory Research Fellowship. \$1500

2012 UC Irvine Faculty Research and Travel "Partial support of field research on ecological speciation and correlational selection"

2011-2013 Center for Environmental Biology, UC Irvine "Impacts of invasive black mustard on pollination of natives" \$11,200

2011 UC Irvine Faculty Research and Travel "Exploratory research: Testing pollinator responses and natural selection on floral volatiles"

2011 Rocky Mountain Biological Laboratory Research Fellowship. \$2500

2011 Fulbright Senior Specialist in Environmental Sciences at University of Otago, New Zealand. \$7866

2010 Elected AAAS Fellow

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- 2010-2013 NSF Academic Research Infrastructure OIA-0963441
“Renovation of the greenhouse research facility at the University of California, Irvine.” \$1,257,826 (co-PI; Brandon Gaut is the PI)
- 2009-2010 National Geographic Society
“Explaining flower color and form in alpine New Zealand: the promise and reality of pollinator responses.” \$10,000
- 2006-2008 NSF DEB-0608284 Doctoral Dissertation Improvement Grant (for Sarah Kimball)
“Mechanisms defining ecological range limits in a plant hybrid zone.” \$11,994
- 2006-2012 NSF DEB-0542876 Population and Evolutionary Processes
“Ecological speciation and the physiological performance of plant hybrids in *Ipomopsis*.” \$400,000
- 2005-2006 UC Irvine School of Biological Sciences Faculty Research Grant
“Hybrid fitness and reproductive isolation in a plant hybrid zone.” \$7,500
- 2003-2005 NSF DEB-0308772 Doctoral Dissertation Improvement Grant (for Carrie Wu)
“Genetic and ecophysiological causes of differential fitness in a natural plant hybrid zone.” \$12,000
- 2002-2004 NSF DEB-0206279 Doctoral Dissertation Improvement Grant (for George Aldridge)
“Comparing prezygotic isolating mechanisms in unimodal and bimodal plant hybrid zones.” \$9,901
- 2002-2003 UC Irvine School of Biological Sciences Faculty Research Grant
“The molecular genetic structure of a natural plant hybrid zone”
- 2002 Election to membership in Sigma Xi
- 2000 UC Irvine Multi-Investigator Faculty Grant (co-PI; PI is Ann Sakai)
“Changes in photosynthetic traits with evolution of separate sexes”
- 1999-2008 NSF DEB-9815878 Population Biology (co-PI; PI is Ann Sakai)
“Evolution of dioecy from gynodioecy: artificial selection for sex allocation patterns.” \$675,202
- 1998-2003 NSF DEB-9805034 Population Biology (co-PI; PI is Mary Price)
“Pollination, plant fitness, and population dynamics: how strong are the links?”
\$199,990
- 1998-2004 NSF DEB-9806547 (supplements DEB-0117003 and DEB-0333001) Population

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Biology "Lifetime fitness of hybrids in natural plant populations: testing models for hybrid zones." \$219,415 including supplements

- 1998 George Lamb Lecturer, University of Nebraska
- 1997 UC Irvine Multi-Investigator Faculty Research Grant (co-PI; PI is Ann Sakai)
"Evolution of dioecy from gynodioecy: artificial selection for sex allocation patterns."
- 1994-1998 NSF DEB-9407144 Systematic and Population Biology
"Evolutionary dynamics of a plant hybrid zone." \$325,350
- 1992-1993 UC Irvine Faculty Fellowship
"Evolutionary dynamics of a plant hybrid zone."
- 1992-1993 UC Irvine Faculty Career Development Award
"Using paternity analysis to study evolution in natural plant populations."
- 1992 UC Natural Reserve System
Elizabeth Hall Blakey Travel Grant
- 1990 UC Irvine Committee for Instructional Development
Curricular Improvement Grant: "Instruction in Field Methods in Ecology."
- 1989-1994 NSF BSR-8996306 Population Biology and Physiological Ecology
"Mechanisms and evolutionary consequences of male and female fitness effects in a natural plant population." \$284,010
- 1986-1989 NSF BSR-8516498 Population Biology and Physiological Ecology
"Sexual selection in a montane wildflower: quantifying selection from measurements of male and female reproduction." \$157,131
- 1984-1985 American Philosophical Society Research Grant
"Sexual selection and flower traits in a hermaphroditic plant."
- 1982 Sigma Xi Grant-in-Aid of Research
"Pollination-limitation on seed set of alpine and subalpine plant populations."
- 1978-1980 James B. Duke Fellowship, Duke University
- 1977-1978 Angier B. Duke Fellowship, Duke University
- 1977 Election to Phi Beta Kappa, Stanford University

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RESEARCH INTERESTS

My major interest is in the mechanisms of evolution in natural plant populations.

Current major projects include:

- Testing correlational selection on floral traits due to mutualists and antagonists
- Field tests of theoretical models for hybrid zones and ecological speciation
- Tests of models for the evolution of sex allocation and breeding systems
- Impacts of invasive species and global change on plant-pollinator interactions

PROFESSIONAL AND SERVICE ACTIVITIES

UNIVERSITY OF CALIFORNIA, IRVINE:

Department of Ecology and Evolutionary Biology:

- GAANN Steering Committee 2010-2011
- Space Advisory Committee 2005-2008
- Strategic Planning and Mentoring Committee 2002-2003
- Molecular Analytical Facility Committee 2002-2004
- Graduate Core Review Committee 2001-2002
- Faculty Search Committees 1993-1997, 2000-2002, 2011-2012
- Electrophoresis Facilities Committee 1992-1999
- Graduate Prescription Committee 1990-1991, 1997-1998
- Curriculum Committee 1989-1995,

School of Biological Sciences:

- Faculty Honors Committee 2009-2010
- Faculty Research and Travel Committee 2008-2011, 2011-2012
- Executive Committee 1992-1995
- Undergraduate Honors Committee 1992-1993, 2011-2013
- Undergraduate Cabinet 1991-1993, 1997-2003

Irvine Campus:

- Sustainability Committee 2012-2013
- Environment Institute Steering Committee 2011-2013
- Phi Beta Kappa Selection 2000-2003, 2008
- Honors Program Advisory Panel 1998-2003
- Undergraduate Scholarships and Financial Aid 1993-1996
- Community Education Committee 1993-1994

University -wide:

- Presidential Advisory Committee to White Mountain Research Station
1993-2002

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ROCKY MOUNTAIN BIOLOGICAL LABORATORY: Research Center Committee 2011-2014, Facilities Committee 2010, Education Committee 2006-2009, Elected Trustee 1998 – 2002, Board Function and Structure committee 2002, Safety committee 1998 – 2002, Nominating committee 1996, 1998-1999, Director's Evaluation committee 1994-1995, Research committee 1991-1993, 2010-2013, Lee Snyder Award Committee 1990-1992, 1997-1998, Membership committee 1987

UNIVERSITY OF VIRGINIA: Library Committee 1988-1989, Undergraduate Curriculum Committee 1986-1987

Member of AAAS, Botanical Society of America, California Native Plant Society, Ecological Society of America, Sigma Xi, Society of American Naturalists, Society for the Study of Evolution, and Rocky Mountain Biological Laboratory.

Elected council member, Society for the Study of Evolution, 1999-2001

Reviewer of manuscripts for Acta Oecologica, American Journal of Botany, American Naturalist, Annals of Botany, Annals of the Missouri Botanical Garden, BioScience, Biological Journal of the Linnean Society, Biotropica, Conservation Biology, Conservation Genetics, Ecography, Ecology, Ecoscience, Evolution, Heredity, International Journal of Plant Sciences, Journal of Applied Ecology, Journal of Ecology, Journal of Evolutionary Biology, Journal of Heredity, Molecular Ecology, Nature, New Phytologist, Oecologia, Oikos, Perspectives in Plant Ecology, Evolution and Systematics, Plant Biology, Plant Science, Science, Southwestern Naturalist, Trends in Ecology and Evolution.

Associate editor for Functional Ecology 2010-2014. Reviewing editor for Journal of Evolutionary Biology 2003-2007. Adhoc editor for Ecology 1996. Associate editor for Evolution 1992-1994.

Reviewer of proposals for National Science Foundation (Biological Oceanography, Ecology, International Programs, Population Biology, Ocean Sciences, Research Opportunities for Women, Population and Evolutionary Processes, Environment and Structural Systems, Ecological Biology), USDA (Biology of Weedy and Invasive Plants, Biotechnology Risk Assessment), NSERC (Evolution and Ecology), and UK (Biotechnology and Biological Sciences Research Council, Natural Environment Research Council).

Panel member for National Science Foundation:

Population Biology 1994 and 1998

Biotic Systems and Resources Doctoral Dissertation Improvement 1991 and 1997

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TEACHING EXPERIENCE

- 2011 Visiting Instructor, Fulbright Senior Specialist in Environmental Sciences, Otago University, NEW ZEALAND
- 1989-2013 Assistant, Associate, and Full Professor, Department of Ecology and Evolutionary Biology, UC Irvine
- Undergraduate Level:
- BioSci 2B Freshman Seminar: Invasive Species
 - BioSci 2B Freshman Seminar: Introduction to Field Biology
 - BioSci 96 Ecology
 - BioSci 140 Evolution and the Environment
 - BioSci 166W Field Methods in Ecology
 - BioSci 185 Plant-Animal Interactions
 - BioSci 197 Special Study
 - BioSci 194 and 199 Independent Research
- Graduate Level:
- EE 200 Independent Research
 - EE 201 Seminar in Ecology & Evolutionary Biology
 - EE 202 Ecology & Evolutionary Biology Research Reviews
 - EE 203 Special Study
 - EE 205 Special Topics in Ecology
 - EE 207 Quantitative Methods in Ecology & Evolutionary Biology
 - EE 221 Advanced Topics in Ecology
 - EE 223 Advanced Applied Statistics
 - EE 245 Plant-Animal Interactions
- 1984-1989 Assistant Professor, Department of Biology, U. Virginia
- Implications of Biology
 - Introduction to Biology
 - Plant Population Biology (upper division course)
 - Evolutionary Biology (graduate course)
 - Colloquium on Plant-Pollinator Interactions (graduate)
 - Member of committees for 5 PhD students and 1 masters student
(Departments of Biology, Chemistry, and Environmental Sciences)
- 1980-1981 Teaching assistant, Department of Zoology, Duke University
- Animal Diversity
 - Principles of Biology
- 1977 Teaching assistant, Department of Biology and Hopkins Marine Station, Stanford

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University
Introduction to Biology
Introduction to Oceanic Biology

PhD Students at UC Irvine:

Wilnelia Recart, 1st year student

Dissertation topic: Evolutionary changes following plant species invasion

Kate Gallagher, 3rd year student

Dissertation topic: Impacts of global change in temperature and precipitation on pollination and reproduction

Daniela Bruckman, 5th year student

Dissertation topic: Effects of invasive species on pollination of native plants

Nelida Pohl, PhD 2008 (co-advised by Adriana Briscoe)

Dissertation title: Insights in ecology and evolution of butterflies

Present position: Lecturer, Universidad de Chile

Sarah Kimball, PhD 2007

Dissertation title: Mechanisms defining ecological range limits in a plant hybrid zone

Present position: Program Coordinator, Center for Environmental Biology, UC Irvine

Carrie Wu, PhD 2005

Dissertation title: Effects of genetic interactions and physiology on differential hybrid fitness in an *Ipomopsis* (Polemoniaceae) hybrid zone

Present position: Assistant Professor, University of Richmond

George Aldridge, PhD 2005

Dissertation title: Comparing prezygotic isolating mechanisms in unimodal and bimodal plant hybrid zones

Present position: Helix Environmental Planning

Jennifer Reithel, PhD 2003

Dissertation title: The ecology and evolution of host plant use by the generalist membracid, *Publilia modesta*

Present position: Science Director, Rocky Mountain Biological Laboratory

Elvia Meléndez-Ackerman, PhD 1995

Dissertation title: Selection on flower color in an *Ipomopsis* hybrid zone

Present position: Professor and Director of Institute for Tropical Ecosystem Studies,

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University of Puerto Rico

Member of committees for 33 other graduate students, including 30 at UC Irvine, one at Rancho Santa Ana Botanic Garden, one at UCSD, and one at University of Wollongong, AUSTRALIA

Postdoctoral scholars:

Mascha Bischoff, PhD. University of Heidelberg, Germany. Postdoc 2009-2011

Steven E. Travers, PhD. University of California, Santa Barbara. Postdoc 2007

Present position: Assistant Professor at North Dakota State University

L. Alan Prather, PhD. University of Texas, Austin. Postdoc 1995-1997

Present position: Associate Professor at Michigan State University

Paul G. Wolf, PhD. Washington State University. Postdoc 1990-1991

Present position: Professor at Utah State University

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PUBLICATIONS

78. Campbell, D.R., M. Forster, and M. Bischoff. 2014. Selection of trait combinations through bee and fly visitation to flowers of *Polemonium foliosissimum*, *Journal of Evolutionary Biology*, in press.
77. Bischoff, M., A. Jürgens, and D.R. Campbell. 2014. Floral scent in natural hybrids of *Ipomopsis* (Polemoniaceae) and their parental species, in press in *Annals of Botany*, in press.
76. Campbell, D.R. and M. Bischoff. 2013. Selection for a floral trait is not mediated by pollen receipt even though seed set in the population is pollen-limited. *Functional Ecology*, 27: 1117-1125.
75. Campbell, D.R. and C. Wendlandt. 2013. Altered precipitation affects plant hybrids differently than their parental species. *American Journal of Botany* 100: 1322-1331.
74. Sakai, A.K., S.G. Weller, D.R. Campbell, T.M. Culley, A.K. Dunbar-Wallis, and A. Andres. 2013. Measure for measure: comparing morphological and biomass traits for sex allocation in two gynodioecious species. *American Journal of Botany* 100: 1071-1082.
73. Bischoff, M., D.R. Campbell, J. M. Lord, and A. W. Robertson. 2013. The relative importance of solitary bees and syrphid flies as pollinators of two outcrossing plant species in the New Zealand alpine. *Austral Ecology* 38: 169-176.
72. Campbell, D.R. and C.A. Wu. 2013. Geographical variation in hybridization of *Ipomopsis* (Polemoniaceae): Testing the role of photosynthetic responses to temperature and water. *International Journal of Plant Sciences* 174: 57-64.
71. Campbell, D.R., M. Bischoff, A.W. Robertson, and J.M. Lord. 2012. Where have all the blue flowers gone: Pollinator responses and selection on flower colour in New Zealand *Wahlenbergia albomarginata* *Journal of Evolutionary Biology* 25: 352-364.
70. Pohl, N.B., J. Van Wyk and D.R. Campbell. 2011. Butterflies show flower colour preferences but not constancy in foraging at four plant species. *Ecological Entomology* 36: 290-300.
69. Campbell, D.R., Weller, S.G., A.K. Sakai, T. M. Culley, P.N. Dang, and A.K. Dunbar-Wallis. 2011. Genetic variation and covariation in floral allocation of two species of *Schiedea* with contrasting levels of sexual dimorphism. *Evolution* 65: 757-770.
68. Waser, N.M., Campbell, D. R., Price, M.V., and A.K. Brody. 2010. Density-dependent demographic responses of a semelparous plant to natural variation in seed rain. *Oikos* 119: 1929-1935.

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67. Campbell, D.R., Wu, C.A. and S.E. Travers. 2010. Photosynthetic and growth responses of reciprocal hybrids to variation in water and nitrogen availability. *American Journal of Botany* 97: 925-933.
66. Campbell, D.R., M. Bischoff, J. Lord, and A.W. Robertson. 2010. Flower color influences insect visitation in alpine New Zealand. *Ecology* 91: 2638-2649.
65. Burd, M., T.L. Ashman, D.R. Campbell, M.R. Dudash, M.O. Johnston, T.M. Knight, S.J. Mazer, R.J. Mitchell, J.A. Steets, and J.C. Vamosi. 2009. Ovule number per flower in a world of unpredictable pollination. *American Journal of Botany* 96: 1159-1167.
64. Campbell, D.R. 2009. Using phenotypic manipulations to study multivariate selection of floral trait associations. *Annals of Botany* 103: 1557-1566.
63. Aldridge, G. and D.R. Campbell. 2009. Genetic and morphological patterns show variation in frequency of hybrids between *Ipomopsis* (Polemoniaceae) zones of sympatry. *Heredity* 102: 257-265.
62. Kimball, S. and D.R. Campbell. 2009. Physiological differences between two species of *Penstemon* and their hybrids in field and common garden environments. *New Phytologist* 181: 478-488.
61. Kimball, S., D.R. Campbell, and C. Lessin. 2008. Differential performance of reciprocal hybrids in multiple environments. *Journal of Ecology* 96: 1306-1318.
60. Campbell, D.R., N.M. Waser, G. Aldridge, and C.A. Wu. 2008. Lifetime fitness in two generations of *Ipomopsis* hybrids. *Evolution* 62: 2616-2627.
59. Campbell, D.R. 2008. Pollinator shifts and the origin and loss of plant species. *Annals of the Missouri Botanical Garden* 95: 264-274.
58. Price, M.V., D.R. Campbell, N.M. Waser, and A.K. Brody. 2008. Bridging the generation gap in plants: pollination, parental fecundity, and offspring demography. *Ecology* 89: 1596-1604.
57. Sakai, A.K., S. G. Weller, T. M. Culley, D.R. Campbell, A.K. Dunbar-Wallis, A.K., and A. Andres. 2008. Sexual dimorphism and the genetic potential for evolution of sex allocation in the gynodioecious plant, *Schiedea salicaria*. *Journal of Evolutionary Biology* 21: 18-29.
56. Reithel, J.R. and D.R. Campbell. 2008. Effects of aggregation size and host plant on the survival of an ant-tended membracid (Hemiptera: Membracidae): Potential roles in selecting for generalized host plant use. *Annals of the Entomological Society of America* 101: 70-78.
55. Wu, C.A. and D.R. Campbell. 2007. Leaf physiology reflects environmental differences and

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- cytoplasmic background in *Ipomopsis* (Polemoniaceae) hybrids. *American Journal of Botany* 94: 1804-1812.
54. Weller, S.G., Sakai, A.K., Culley, T.M., Campbell, D.R., Ngo, P, and A.K. Dunbar-Wallis. 2007. Sexually dimorphic inflorescence traits in a wind-pollinated species: heritabilities and genetic correlations in *Schiedea adamantis* (Caryophyllaceae). *American Journal of Botany* 94: 1716-1725.
53. Aldridge, G. and D.R. Campbell. 2007. Variation in pollinator preference between two *Ipomopsis* contact sites that differ in hybridization rate. *Evolution* 61: 99-110.
52. Campbell, D.R. and N.M. Waser. 2007. Evolutionary dynamics of an *Ipomopsis* hybrid zone: confronting models with lifetime fitness data. *American Naturalist* 169: 298-310. (Selected by Faculty of 1000).
51. Aldridge, G. and D.R. Campbell. 2006. Asymmetrical pollen success in *Ipomopsis* (Polemoniaceae) contact sites. *American Journal of Botany* 93: 903-909.
50. Campbell, D.R. and G. Aldridge. 2006. Floral biology in hybrid zones. In Harder L. and Barrett S (ed.) *Ecology and Evolution of Flowers*. Oxford University Press, Oxford.
49. Wu, C.A. and D. R. Campbell. 2006. Environmental stressors differentially affect leaf ecophysiological responses in two *Ipomopsis* species and their hybrids. *Oecologia* 148: 202-212.
48. Culley, T.M., A.K. Dunbar-Wallis, A.K. Sakai, S.G. Weller, M. Mishio, D.R. Campbell, and M. Herzenach. 2006. Genetic variation of ecophysiological traits in two gynodioecious species of *Schiedea* (Caryophyllaceae). *New Phytologist* 169: 589-601.
47. Knight, T.M., J.A. Steets, J.C. Vamosi, S.J. Mazer, M. Burd, D.R. Campbell, M.R. Dudash, M.O. Johnston, R.J. Mitchell, and T.L. Ashman. 2005. Pollen limitation of plant reproduction: pattern and process. *Annual Review of Ecology, Evolution and Systematics* 36: 467-497.
46. Weller, S.G., A.K. Sakai, T.M. Culley, D.R. Campbell, and A.K. Dunbar-Wallis. 2005. Predicting the pathway to wind pollination: Heritabilities and genetic correlations of inflorescence traits associated with wind pollination in *Schiedea salicaria* (Caryophyllaceae). *Journal of Evolutionary Biology* 19: 331-342.
45. Campbell, D.R., C.A. Wu, and C. Galen. 2005. Ecophysiology of first and second generation hybrids in a natural plant hybrid zone. *Oecologia* 144: 214-225.
44. Price, M.V., Waser, N.M., Irwin, R.E., Campbell, D.R., and A.K. Brody. 2005. Temporal and spatial variation in pollination of a montane herb: a seven-year study. *Ecology* 86: 2106-2116.

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43. Wu, C.A. and D.R. Campbell. 2005. Cytoplasmic and nuclear markers reveal contrasting patterns of spatial genetic structure in a natural *Ipomopsis* hybrid zone. *Molecular Ecology* 14: 781-792.
42. Ashman, T., T.M. Knight, J. Steets, P. Amarasekare, M. Burd, D.R. Campbell, M.R. Dudash, M.O. Johnston, S.J. Mazer, R.J. Mitchell, M.T. Morgan, and W.G. Wilson. 2004. Pollen limitation of plant reproduction: Ecological and evolutionary causes and consequences. *Ecology* 85:2408-2421.
41. Campbell, D.R. 2004. Natural selection in *Ipomopsis* hybrid zones: implications for ecological speciation. *New Phytologist* 161: 83-90.
40. Campbell, D.R., Alarcon, R., and C.A. Wu. 2003. Reproductive isolation and hybrid pollen disadvantage in *Ipomopsis*. *Journal of Evolutionary Biology* 16: 536-540.
39. Waser, N.M. and D.R. Campbell. 2004. Adaptive speciation in flowering plants. In Dieckmann, U., Metz, H., Doebeli, M. and Tautz, D. (editors), *Adaptive Speciation*. Cambridge University Press, Cambridge, UK.
38. Campbell, D.R., M. Crawford, A.K. Brody, and T.A. Forbis. 2002. Resistance to predispersal seed predation in a natural hybrid zone. *Oecologia* 131: 436-443.
37. Campbell, D.R., N.M. Waser, and G.T. Pederson. 2002. Predicting patterns of mating and potential hybridization from pollinator behavior. *American Naturalist* 159: 438-450.
36. Campbell, D.R. and N.M. Waser. 2001. Genotype by environment interaction and the fitness of plant hybrids in the wild. *Evolution* 55:669-676.
35. Wolf, P. G., D. R. Campbell, N. M. Waser, S. D. Sipes, T. R. Toler, and J. K. Archibald. 2001. Tests of pre- and post-pollination barriers to hybridization between sympatric species of *Ipomopsis* (Polemoniaceae). *American Journal of Botany* 88: 213-219.
34. Campbell, D.R. 2000. Experimental tests of sex allocation theory in plants. *Trends in Ecology and Evolution* 15: 227-231.
33. Alarcón, R. and D. R. Campbell. 2000. Absence of conspecific pollen advantage in the dynamics of an *Ipomopsis* (Polemoniaceae) hybrid zone. *American Journal of Botany* 87: 819-824.
32. Sork, V. L., J. Nason, D. R. Campbell, and J. F. Fernandez-M. 1999. Landscape approaches to historical and contemporary gene flow in plants. *Trends in Ecology and Evolution* 14: 219-223.
31. Krupnick, G. A., A. E. Weis, and D. R. Campbell. 1999. The consequences of floral herbivory for pollinator service to *Isomeris arborea*. *Ecology* 80: 125-134.

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30. Campbell, D. R., N. M. Waser, and P. G. Wolf. 1998. Pollen transfer by natural hybrids and parental species in an *Ipomopsis* hybrid zone. *Evolution* 52: 1602-1611.
29. Meléndez-Ackerman, E., and D. R. Campbell. 1998. Adaptive significance of flower color and inter-trait correlations in an *Ipomopsis* hybrid zone. *Evolution* 52: 1293-1303.
28. Campbell, D. R. 1998. Variation in lifetime male fitness in *Ipomopsis aggregata*: tests of sex allocation theory. *American Naturalist* 152: 338-353.
27. Campbell, D. R. 1998. Multiple paternity in fruits of *Ipomopsis aggregata* (Polemoniaceae). *American Journal of Botany* 85: 1022-1027.
26. Campbell, D. R. 1997. Genetic correlation between biomass allocation to male and female functions in a natural plant population. *Heredity* 79:606-614.
25. Meléndez-Ackerman, E., D. R. Campbell, and N. M. Waser. 1997. Hummingbird behavior and mechanisms of selection on flower color in *Ipomopsis*. *Ecology* 78: 2532-2541.
24. Campbell, D. R. 1997. Genetic and environmental variation in life-history traits of a monocarpic perennial: a decade-long field experiment. *Evolution* 51: 373-382.
23. Campbell, D. R., N. M. Waser, and E. J. Meléndez-Ackerman. 1997. Analyzing pollinator-mediated selection in a plant hybrid zone: hummingbird visitation patterns on three spatial scales. *American Naturalist* 149: 295-315.
21. Campbell, D. R., N. M. Waser, and M. V. Price. 1996. Mechanisms of hummingbird-mediated selection for flower width in *Ipomopsis aggregata*. *Ecology* 77: 1463-1472.
20. Wolf, P. G. and D. R. Campbell. 1995. Hierarchical analysis of allozymic and morphometric variation in a montane herb, *Ipomopsis aggregata* (Polemoniaceae). *Journal of Heredity* 86: 386-394.
19. Campbell, D. R., N. M. Waser, and M. V. Price. 1994. Indirect selection of stigma position in *Ipomopsis aggregata* via a genetically correlated trait. *Evolution* 48: 55-68.
18. Campbell, D. R. and K. J. Halama. 1993. Resource and pollen limitations to lifetime seed production in a natural plant population. *Ecology* 74: 1043-1051.
17. Campbell, D. R. 1992. Variation in sex allocation and floral morphology in *Ipomopsis aggregata* (Polemoniaceae). *American Journal of Botany* 79: 516-521.
16. Weis, A. E. and D. R. Campbell. 1992. Plant genotype: a variable factor in insect-plant

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interactions. Pages 75-111 in M. D. Hunter, T. Ogushi and P. W. Price (eds.), Resource Distribution and Animal- Plant Interactions. Academic Press, San Diego.

15. Campbell, D.R. and J.D. Dooley. 1992. The spatial scale of genetic differentiation in a hummingbird-pollinated plant: comparison with models of isolation by distance. *American Naturalist* 139: 735-748.

14. Campbell, D.R. 1991. Comparing pollen dispersal and gene flow in a natural plant population. *Evolution* 45: 1965-1968.

13. Campbell, D.R., N.M. Waser, M.V. Price, E.A. Lynch, and R.J. Mitchell. 1991. Components of phenotypic selection: pollen export and flower corolla width in *Ipomopsis aggregata*. *Evolution* 45: 1458-1467.

12. Campbell, D.R. 1991. Effects of floral traits on sequential components of maternal fitness in *Ipomopsis aggregata*. *American Naturalist* 137: 713-737.

11. Campbell, D.R. and N.M. Waser. 1989. Variation in pollen flow within and among populations of *Ipomopsis aggregata*. *Evolution* 43: 1444-1455.

10. Campbell, D.R. 1989. Inflorescence size: test of the male function hypothesis. *American Journal of Botany* 76: 730-738.

9. Campbell, D.R. 1989. Measurements of selection in a hermaphroditic plant: variation in male and female pollination success. *Evolution* 43: 318-334.

8. Campbell, D.R. and N.M. Waser. 1987. The evolution of plant mating systems: multilocus simulations of pollen dispersal. *American Naturalist* 129: 593-609.

7. Campbell, D.R. 1987. Interpopulational variation in fruit set: the role of pollination-limitation in the Olympic Mountains. *American Journal of Botany* 74: 269-273.

6. Campbell, D.R. 1986. Predicting plant reproductive success from models of competition for pollination. *Oikos* 47: 257-266.

5. Campbell, D.R. and A.F. Motten. 1985. The mechanism of competition for pollination between two forest herbs. *Ecology* 66: 554-563.

4. Campbell, D.R. 1985. Pollinator sharing and seed set of *Stellaria pubera*: competition for pollination. *Ecology* 66: 544-553.

3. Campbell, D.R. 1985. Pollen and gene dispersal: the influences of competition for pollination. *Evolution* 39: 418-431.

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2. Campbell, D.R. 1983. Pollinator sharing and reproduction in a forest herb. PhD dissertation, Duke University, Durham NC.

1. Motten, A.F., D.R. Campbell, D.E. Alexander, and H.L. Miller. 1981. Pollination effectiveness of specialist and generalist visitors to a North Carolina population of *Claytonia virginica*. *Ecology* 62: 1278-1287.

INVITED SYMPOSIUM / WORKSHOP PAPERS

Evolution of flower color: phenotypic integration with floral morphology and vegetative traits. 2008. Congreso Mexicano de Ecología, Merida, MEXICO.

Insect responses to flower color and form in alpine New Zealand: promise and reality. 2008. Pollination Ecology Conference, Milwaukee, WI.

Pollinator shifts, pollinator losses, and floral evolution. 2006. Systematics Symposium at Missouri Botanical Garden, St. Louis, MO.

The quantitative genetic basis of breeding system evolution in *Schiedea* (Caryophyllaceae) in the Hawaiian Islands. 2005. Botanical Society of America Annual Meeting, Austin, TX.

Pollination, plant fitness, and population dynamics: how strong are the links? 2003-2004. Workshop on Pollen Limitation, National Center for Ecological Analysis and Synthesis, Santa Barbara, CA.

The quantitative genetics of sex allocation in gynodioecious *Schiedea salicaria* (Caryophyllaceae). 2002. Symposium on Systematics and Evolution of the Caryophyllaceae, American Society of Plant Taxonomists Annual Meeting, Madison, WI

Evolutionary consequences of hybridization with invasive plants: two key questions. 2002. Symposium on Evolutionary Consequences of Biological Invasions, Institute for Mathematics and its Applications, University of Minnesota, MN

Selection in a plant hybrid zone. 1999. Workshop on The Formation of Biodiversity Through Adaptive Speciation, International Institute for Applied Systems Analysis, Laxenburg, AUSTRIA.

Selection on sex allocation in *Ipomopsis aggregata*: test of the theory. 1999. Symposium on The Ecology and Genetics of Plant Reproductive Characters. XVI

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International Botanical Congress, St. Louis, Missouri.

Estimating gene flow within and between populations in a plant hybrid zone. 1998.
Workshop on Theoretical and Empirical Approaches to the Study of Gene Flow
in Fragmented and Managed Populations, National Center for Ecological Analysis and
Synthesis, Santa Barbara, CA.

The ecological basis of selection through male and female functions in hermaphroditic plants.
Distances of pollen-mediated gene flow.
1991. Symposium on Plant Reproductive Ecology, Scandinavian Association for
Pollination Ecology, Uppsala, SWEDEN.

Measuring selection of floral traits in natural plant populations. 1989.
Symposium on Evolution of Plant Mating Systems, Botanical Society of America
Annual Meeting, Toronto, CANADA.

Pollinator efficiency: effects of pollen quality and competitors for pollination in natural
populations. 1984. Symposium on Pollinator Efficiency, Entomological Society of
America Annual Meeting, San Antonio, TX.

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CONTRIBUTED PAPERS (First or sole author ones only; others not listed)

- The next generation: fitness of *Ipomopsis* (Polemoniaceae) hybrids in the wild. 2007.
Society for the Study of Evolution Annual Meeting.
- Predicting patterns of mating and rates of hybridization from pollinator behavior. 2001.
Society for the Study of Evolution Annual Meeting.
- Survival of parental and hybrid offspring across an *Ipomopsis* hybrid zone. 1998.
Society for the Study of Evolution Annual Meeting.
- Selection and clinal variation in a hybrid zone: analyzing the role of pollination. 1996.
Botanical Society of America Annual Meeting.
- Quantitative genetics of floral traits in *Ipomopsis aggregata*: a 9 year field experiment.
1995. Society for the Study of Evolution Annual Meeting.
- Potential evolution of floral morphology via selection on a genetically-correlated trait.
1993. Society for the Study of Evolution Annual Meeting.
- Distances of gene flow and the spatial scale of genetic differentiation in hummingbird-
pollinated *Ipomopsis aggregata*. 1991. Society for Study of Evolution Annual Meeting.
- A mechanistic analysis of phenotypic selection: pollen export and flower corolla width.
1990. Ecological Society of America Annual Meeting.
- Measuring selection through male and female functions in hermaphroditic plants. 1987.
American Society of Naturalists - Society for the Study of Evolution Annual Meeting.
- Selection through male and female reproduction in the hermaphroditic plant
Ipomopsis aggregata. 1986. Ecological Society of America Annual Meeting.
- Evolution of outcrossing distance: computer simulations. 1984. American Society of
Naturalists - Society for the Study of Evolution Annual Meeting.
- Pollinator sharing and gene flow in plant populations. 1983. Ecological Society of America
Annual Meeting.
- Competition for pollination between two spring wildflowers. 1981. Ecological Society of
America Annual Meeting.

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INVITED SEMINARS

- 2013 Department of Biology, University of Richmond
- 2011 Botany Department, Otago University, NEW ZEALAND
Department of Ecology, Evolution and Marine Biology, UC Santa Barbara
- 2010 Department of Integrative Biology, University of California, Berkeley
- 2008 Department of Plant Sciences, University of Arizona
- 2007 Section of Integrative Biology, University of Texas, Austin
- 2005 Department of Genetics, University of Georgia
- 2001 Division of Biological Sciences, University of Missouri, Columbia
- 2000 School of Biological Sciences, Washington State University
Rancho Santa Ana Botanic Garden
- 1999 Botanical Institute, University of Copenhagen, DENMARK
Departments of Plant Systematics and Genetics, Lund University, SWEDEN
Ecology and Evolutionary Biology, Leiden University, NETHERLANDS
Biology Department, California State University, Northridge
- 1998 School of Biological Sciences, University of Nebraska – Lincoln
- 1997 Rocky Mountain Biological Laboratory
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- 1990 Zoologisches Institut der Universitaet Basel, Basel, SWITZERLAND
- 1989 Department of Botany, University of Washington
Departments of Botany, Zoology, and Genetics, Washington State
Section of Ecology and Systematics, Cornell University
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- 1985 Department of Biology, Seton Hall University
- 1984 Department of Biology, University of Virginia