

Bodil N. Cass

Agricultural Scientist – Entomology, Department of Agriculture, Weights & Measures, County of San Diego
Research Affiliate, Department of Entomology & Nematology, University of California, Davis
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RESEARCH AREAS

Citrus Entomology, Integrated Pest Management, Ecoinformatics, Agroecology, Insect Symbionts

EDUCATION

Ph.D. Entomology, University of Arizona, 2015

Graduate Interdisciplinary Programs, minor Ecology & Evolutionary Biology

Thesis: *Population dynamics and genomics of Rickettsia infecting the whitefly Bemisia tabaci*

Committee: Martha (Molly) Hunter, Diana Wheeler, Wendy Moore, Jeremiah Hackett

BSc. Hons. Genetics, The University of Queensland, 2006

School of Integrative Biology – Valedictorian, High Distinction, Dean’s Commendation for High Achievement

Advanced Studies Program in Science (2003 – 2005) and Enhanced Studies Program in Chemistry (2012)

Thesis: *Can Wolbachia mediate iron homeostasis in insects? Understanding the population invasion paradox*

Committee: Scott O’Neill, Jeremy Brownlie, Karyn Johnson, Sassan Asgari

RESEARCH PUBLICATIONS orcid.org/0000-0002-3807-2822

21. Rosenheim JA, Cluff E, Lippey MK, Cass BN, Paredes D, Parsa S, Karp DS, Chaplin-Kramer R (2022) *Reply to Marini et al.: Insect spill-over is a double-edged sword in agriculture*. Proceedings of the National Academy of Sciences. 120:e2219197120. <https://doi.org/10.1073/pnas.221919712>
20. Rosenheim JA, Cluff E, Lippey MK, Cass BN, Paredes D, Parsa S, Karp DS, Chaplin-Kramer R (2022) *Increasing crop field size does not consistently exacerbate insect pest problems*. Proceedings of the National Academy of Sciences. 119(37):e2208813119. <https://doi.org/10.1073/pnas.2208813119>
19. Kahl HM, Mueller TG, Cass BN, Xi X, Cluff E, Rosenheim JA (2022) *Herbivory by European Earwigs (Forficula auricularia; Dermaptera: Forficulidae) on Citrus Species Commonly Cultivated in California*. Journal of Economic Entomology. 115(3):852–862. <https://doi.org/10.1093/jee/toac030>
18. Kahl HM, Mueller TG, Cass BN, Xi X, Cluff E, Grafton-Cardwell EE, Rosenheim JA (2021) *Characterizing herbivory by European Earwigs (Dermaptera: Forficulidae) on navel orange fruit with comparison to Forktailed Bush Katydid (Orthoptera: Tettigoniidae) herbivory*. Journal of Economic Entomology. 114(4):1722–32. <https://doi.org/10.1093/jee/toab121>
17. Cass BN, Kahl HM, Mueller TG, Xi X, Grafton-Cardwell EE, Rosenheim JA (2021) *Profile of fork-tailed bush katydid (Orthoptera: Tettigoniidae) feeding on fruit of clementine mandarins*. Journal of Economic Entomology. 114 (1), 215–224. <https://doi.org/10.1093/jee/toaa258>
16. Cass BN, Hack LM, Buckmann D, Mueller TG, Grafton-Cardwell EE, Rosenheim JA (2020) *Arthropod infestation levels on mandarins in California*. Journal of Economic Entomology. 113(5):2335–2342. <https://doi.org/10.1093/jee/toaa141>
15. Rosenheim JA, Cass BN, Kahl HM, Steinmann KP (2020) *Variation in pesticide use across crops in California agriculture: economic and ecological drivers*. Science of the Total Environment. 733:138683. <https://doi.org/10.1016/j.scitotenv.2020.138683>
14. Cass BN, Grafton-Cardwell EE, Rosenheim JA (2019) *Resistance of fruits from a mandarin cultivar to feeding by fork-tailed bush katydids*. Journal of Economic Entomology. 112(6):2861–2871. <https://doi.org/10.1093/jee/toz241>
13. Mueller TG, Kahl HM, Cass BN, Grafton-Cardwell EE, Rosenheim JA (2019) *Differential impacts of citrus thrips across sweet orange and mandarin species*. Journal of Economic Entomology. 112(6):2767–2773. <https://doi.org/10.1093/jee/toz178>
12. Cass BN, Hack LM, Grafton-Cardwell EE, Rosenheim JA (2019) *Impacts of fruit-feeding arthropod pests on oranges and mandarins in California*. Journal of Economic Entomology. 112(5):2268–2277. <https://doi.org/10.1093/jee/toz133>

11. Banks HT, Everett RA, Murad N, White RD, Banks JE, **Cass BN**, Rosenheim JA (2018) *Optimal design for dynamical modeling of citrus red mite populations*. Mathematical Biosciences and Engineering. 15(4):993-1010. <https://doi.org/10.3934/mbe.2018044>
10. **Cass BN**, Himler AG, Bondy EC*, Bergen JE, Fung SK*, Kelly SE, Hunter MS (2016) *Conditional fitness benefits of a Rickettsia bacterial symbiont in an insect pest*. Oecologia. 180(1):169–179. <https://doi.org/10.1007/s00442-015-3436-x>
9. Gebiola M, White JA, **Cass BN**, Kozuch A, Harris LR, Kelly SE, Karimi J, Giorgini M, Perlman SJ, Hunter MS (2016) *Cryptic diversity, reproductive isolation and cytoplasmic incompatibility in a classic biological control success story*. Biological Journal of the Linnean Society. 117(2):217–230. <https://doi.org/10.1111/bij.12648>
8. **Cass BN**, Yallouz R, Bondy EC*, Mozes-Daube N, Horowitz AR, Kelly SE, Zchori-Fein E, Hunter MS (2015) *Dynamics of the endosymbiont Rickettsia in an insect pest*. Microbial Ecology. 70(1):287–297. <https://doi.org/10.1007/s00248-015-0565-z>
7. **Cass BN**, Mozes-Daube N, Iasur-Kruh L, Bondy EC*, Kelly SE, Hunter MS, Zchori-Fein E (2014) *Bacterial endosymbionts in field-collected samples of Trialeurodes sp. nr. abutiloneus (Hemiptera: Aleyrodidae)*. Research in Microbiology. 165(2):77–81. <https://doi.org/10.1016/j.resmic.2014.01.005>
6. Penz T, Schmitz-Esser S, Kelly SE, **Cass BN**, Müller A, Woyke T, Malfatti SA, Hunter MS, Horn M (2012) *Comparative genomics suggests an independent origin of cytoplasmic incompatibility in Cardinium hertigii*. PLoS Genetics. 8(10):e1003012. <https://doi.org/10.1371/journal.pgen.1003012>
5. Li X, Bai S, **Cass BN** (2012) *Accord insertion in the 5' flanking region of CYP6G1 confers nicotine resistance in Drosophila melanogaster*. Gene. 502(1):1–8. <https://doi.org/10.1016/j.gene.2012.04.031>
4. Degan PH, Leonardo TE, **Cass BN**, Hurwitz B, Stern D, Gibbs RA, Richards S, Moran NA (2010) *Dynamics of genome evolution in facultative symbionts of aphids*. Environmental Microbiology. 12(8):2060–2069. <https://doi.org/10.1111/j.1462-2920.2009.02085.x>
3. International Aphid Genomics Consortium (2010) *Genome Sequence of the Pea Aphid Acyrthosiphon pisum*. PLoS Biology. 8(2):e1000313. <https://doi.org/10.1371/journal.pbio.1000313>
2. Brownlie JC, **Cass BN**, Riegler M, Witsenburg JJ, Iturbe-Ormaetxe I, McGraw EA, O'Neill SL (2009) *Evidence for metabolic provisioning by a common invertebrate endosymbiont, Wolbachia pipientis, during periods of nutritional stress*. PLoS Pathogens. 5:e1000368. <https://doi.org/10.1371/journal.ppat.1000368>
1. McMeniman CJ, Lane RV, **Cass BN**, Fong AWC, Sidhu M, Wang Y, O'Neill SL (2009) *Stable introduction of a life-shortening Wolbachia infection into the mosquito Aedes aegypti*. Science. 323(5910):141–144. <https://doi.org/10.1126/science.1165326>

*mentored undergraduate researcher

EXTENSION PUBLICATIONS

10. **Cass BN**, Kahl H, Grafton-Cardwell EA, Rosenheim JA (2022) Comparing the Fruit Rind Scarring that Three Early-Season Pests Cause in Mandarin Species and Sweet Orange. UC ANR Publication 8708. <https://doi.org/10.3733/ucanr.8708>
9. Department of Agriculture, Weights and Measures (2022) County of San Diego 2021 Crop Statistics and Annual Report. County of San Diego; contributed photographs and data.
8. County of San Diego Apiary Program & California Master Beekeeper Program (CAMBP; 2022) Best Management Practices for Honey Bee Removal Specialists. University of California Cooperative Extension online course
7. County of San Diego Apiary Program & California Master Beekeeper Program (CAMBP; 2021) What to consider when hiring a Bee Removal Specialist. University of California Cooperative Extension website page
6. Plant Pest Diagnostics Laboratory (2021-2022, multiple issues) Quarterly newsletter. Department of Agriculture, Weights and Measures, County of San Diego. Vol. 1(1–4); Vol. 2 (1, *in press*).
5. **Cass BN**, Morse JG, Grafton-Cardwell EA (2020) Updates to UC IPM online training courses for citrus thrips and fork-tailed bush katydids.
4. **Cass BN**, Grafton-Cardwell EA, Rosenheim JA (2021) Fork-tailed bush katydid fruit scarring in clementine mandarins. Citrograph. 12(1):48-53.
3. **Cass BN**, Kahl H, Grafton-Cardwell EA, Rosenheim JA (2020) Updates to UC IPM guidelines for citrus thrips, European earwigs, and fork-tailed bush katydids. Citation: Grafton-Cardwell EE, Baldwin RA, Becker JO,

Eskalen A, Lovatt CJ, Rios S, Adaskaveg JE, Faber BA, Haviland DR, Hembree KJ, Morse JG, Westerdahl BB. Revised continuously. *UC IPM Pest Management Guidelines: Citrus*. [UC ANR Publication 3441](#).

2. Cass BN, Grafton-Cardwell EA, Rosenheim JA (2019) Resistance of ‘Tango’ mandarin fruits to fork-tailed bush katydids. *Citrograph*. 11(1):58–61

1. Cass BN, Grafton-Cardwell EA, Rosenheim JA (2018) A “Big Data” Approach for Pest Management in Mandarins. *Citrograph*. 10(1):62–65

RESEARCH GRANTS

co-Principal Investigator Citrus Research Board – Pest Management (2020-2022)	\$180,000
co-Principal Investigator Department of Pesticide Regulation – Pest Management (2018-2020)	\$239,888
co-Principal Investigator Citrus Research Board – Pest Management (2017-2019)	\$150,000
Arizona Board of Regents Doctoral Research Grant (2012)	\$5,000
Center for Insect Science Graduate Research Stipend (2010)	\$500
Center for Insect Science Graduate Research Stipend (2009)	\$500

TEACHING

Instructor of Record: **Introductory Biology Labs**, Department of Molecular and Cellular Biology, University of Arizona, Fall 2009, Spring 2010, 50 students per semester, freshman level.

Teaching Assistant: **Insects and Culture**, Department of Entomology, University of Arizona, Spring 2014, 100 students, freshman level for non-biology majors.

Teaching Assistant: **Genetics**, Department of Ecology and Evolutionary Biology, University of Arizona, Fall 2010, 100 students, senior level.

Support Staff: **Gentle Intro to R/RStudio**, Department of Entomology & Nematology, University of California, Davis, Winter 2019, 12 students, senior level research scholars program.

FELLOWSHIPS

P.E.O. International Peace Scholarship (2008 and 2009)	\$10,500
University of Queensland Academic Excellence Award (2006)	\$6,000
Smart Women, Smart State Award (2005)	\$2,500
Australian Federal Government Students Prize (2002)	\$2,000
R. F. Chapman Prize for Outstanding Graduate Student in Insect Science (2013)	\$1,500
Carruth Scholarship for Outstanding Graduate Student in Entomology (2014)	\$500

COMMUNICATION & TRAVEL AWARDS

H.E. Carter Travel Award for Graduate Interdisciplinary Program students (2012)	\$600
University of Arizona Institute of the Environment Travel Grant (2012)	\$500
University of Arizona Graduate and Professional Student Council Travel Award (2012)	\$500
Center for Insect Science Travel Award (2011)	\$500
Entomology Society of America Child Care Grant (2018)	\$400
County of San Diego Directors Checkbook Award (2021)	\$300
Arizona Student Union Textbook Scholarship (2010)	\$500
International <i>Wolbachia</i> Meeting Communication Award, 2 nd place (2012)	\$100
Entomology Society of America Meeting President’s Prize, 2 nd place SysEB category (2015)	\$50
County of San Diego Ace of H.E.A.R.T. Award 2022	\$25
County of San Diego Ace of H.E.A.R.T. Award 2021	\$25

RESEARCH APPOINTMENTS

Agricultural Scientist – Entomology, Department of Agriculture, Weights and Measures, County of San Diego (full-time, 2021 – present)

Postdoctoral Scholar, Dept. Entomology & Nematology (full-time, 2016 – 2020, associate, 2021 – present) and Center for Population Biology (associate, 2017 – 2018) University of California, Davis

Graduate Research Assistant, Dept. Entomology, University of Arizona (part-time, 2011 – 2015)

Research Assistant, School of Integrative Biology, The University of Queensland (full-time, 2007)

Undergraduate Research Assistant, Life Sciences, The University of Queensland (part-time, 2003 – 2005)

EXTENSION PRESENTATIONS & FIELD DEMONSTRATIONS

CE Presentation & Booth. *Current Pest Alerts for Southern California*. Professional Tree Care Association 33rd Annual Seminar and Field Day, San Diego, CA, USA (2022)

Informational Presentation. *Defensive honey bees in the environment and bee safety*. World Bee Day Celebration at the Japanese Friendship Garden at Balboa Park, San Diego, CA, USA (2022)

Informational Presentation, Booth, Building Lighting. *Pollinator Week*. County Administration Center, San Diego, CA, USA (2022)

Informational Booth. *Pollinator Protection and Plant Pest Diagnostics in Agriculture, Weights and Measures*. Earth Day event at Balboa Park, San Diego, CA, USA (2022)

CE Presentation. *Spotted Lanternfly and Tree of Heaven*. San Diego Weed Management Area Annual Symposium, County of San Diego & UCCE, virtual (2022)

CE Presentation. *Current Pest Management Strategies for California Trees*. Professional Tree Care Association 32nd Annual Seminar and Field Day, San Diego, CA, USA. (2021)

Host & Facilitator. Bee Safe Program Apiary Inspector Training and Field Day. CDFA (2021)

CE Presentation. *South American Palm Weevil County Updates and Control Options*. UC IPM, virtual (2021)

Newspaper Interview. La Jolla Light. *Are sightings of lots of dead bees cause for pesticide concern? It's 'hard to tell'* August 1. 2021 Author: Elisabeth Frausto.

News Video Interview. CBS 8. Does San Diego have murder hornets? June 30, 2021. Author: Shawn Styles.

Pest Alert Presentation. Farm Bureau San Diego County Monthly Meeting, virtual (2021)

Informational Presentation. Farm Bureau San Diego County Monthly Meeting, virtual (2021)

Informational Presentation. *Apiary Registration*. San Diego Beekeeping Society. Monthly meetings. San Diego, , CA, USA (2021, 2022)

Field Demonstration Day & Continuing Education credits (CE) Presentation. *Citrus Fruit Scarring Demonstration Day*. UC Citrus Research and Extension Center, CA, USA (2019)

Symposium Presentation. Pacific Branch Entomological Society of America Meeting, San Diego, CA, USA (2019)

CE Presentation. Fall Citrus Meeting, Tulare, CA, USA (2019)

Extension Presentation. Association of Applied IPM Entomologists Annual Meeting, Visalia, CA, USA (2018)

Research Presentation. Entomological Society of America Annual Meeting, Vancouver, BC, Canada (2018)

Field Demonstration Day & CE Presentation. Citrus Thrips Field Day, Exeter, CA, USA (2018)

Symposium Presentation. Entomological Society of America Annual Meeting, Denver, CO, USA (2017)

Department Seminar. UC Davis Department of Entomology Seminar Series, Davis, CA, USA (2017)

Extension Presentation. Citrus Research Board & HLB External Review Meeting, Davis, CA, USA (2017)

Research Presentation. Coordination of Integrated Pest Management Research and Extension/Educational Programs for the Western States and Pacific Basin Territories, ARDP Project Director Workshop, Irvine, CA, USA (2017)

Research Presentation. International Congress of Entomology, Orlando, FL, USA (2016)

Department Seminar. UC Davis Center for Population Biology Fall Seminar Series, Davis, CA, USA (2016)

Research Presentation. Entomological Society of America Annual Meeting, Minneapolis, MN, USA (2015)

Research Presentation. 7th International Wolbachia Conference, Ile d'Oléron, France (2012)

Research Presentation & Graduate Interdisciplinary Program information booth. Entomological Society of America Annual Meeting, Reno, NV, USA (2011)

Research Presentation. Center for Insect Science Hexapodium, Tucson, AZ, USA (2009, 2011)

Research Presentation. Institute of the Environment Environmental Research Grad Blitz, Tucson, AZ, USA (2011)
Poster Session. Genetics Society of Australia, Brisbane, QLD, Australia (2006)
Poster Session. University of Queensland Undergraduate Research Conference, Brisbane, QLD, Australia (2005)
Research Presentation. University of Queensland Undergraduate Research Conference, Brisbane, QLD, Australia (2005)

ACADEMIC SERVICE

Undergraduate research project mentor:

- S. Yokota, Entomology, University of California, Davis
- E.A. Bondy, Ecology and Evolutionary Biology, University of Arizona, and Undergraduate Biology Research Program and Biomedical Research Abroad scholarship recipient full funding for 6-month research project at Griffith University, Queensland, Australia
- S.K. Fung, Pre-pharmacy, College of Health Sciences, University of Arizona

Journal reviewer:

- Journal of Economic Entomology (2 manuscripts 2020)
- Ecology and Evolution (1 manuscript 2020)
- Insect Science (1 manuscript 2020)
- Microbial Ecology (1 manuscript 2018, 1 manuscript 2019)
- Microorganisms (1 manuscript 2019)
- Environmental Entomology (1 manuscript 2017)
- Molecular Ecology (3 manuscripts 2016)
- Neotropical Entomology (2 manuscripts 2016)

Elected student/postdoctoral scholar representative:

- Executive Committee of the Graduate Interdisciplinary Program in Entomology and Insect Science, University of Arizona (2010 – 2012)
- Entomology and Nematology Department Teaching Retreat, University of California, Davis (2018)
- Entomology Graduate Student Association, University of Arizona (2009 – 2012)

Seminar speaker host:

- Department of Entomology and Nematology, University of California, Davis (Winter 2017)
- Department of Entomology, University of Arizona (Fall 2009)
- Center for Insect Science (2010)

Judge:

- Student Competition, Entomological Society of America Annual Meeting, virtual/remote (2020)
- Student Competition, Pacific Branch of the Entomological Society of America Meeting, San Diego, CA (2019)
- Graduate Student Travel Grants, Graduate and Professional Student Council, University of Arizona (2009)

Volunteer:

- Virtual Posters, Entomological Society of America Annual Meeting in Reno, NV (2011)
- Insect Festival – Life in Miniature (booth host, preparation, poster design; Arizona 2011, 2012, 2013, 2014)
- Arizona-Sonora Desert Museum – Meet the Beetles (booth host; 2010)
- Insect Discovery Outreach Program, Workshop at Lamb's Gate Elementary School (workshop leader; 2009)
- 4-H Youth Development Entomology Workshop (workshop leader; 2010)
- Molecular Biology Workshop at BASIS Middle School (instructor; 2010)
- Insect Discovery Outreach Program – Donation of archived insect specimen teaching materials (three cases of identified insects and pinning supplies; 2015)

DIVERSITY & INCLUSION

Mentor:

- Two cohorts of two students, 12-week part-time program for ‘at risk’ youth, Agricultural Sustainability for Youth Career Readiness Employment, San Diego Workforce Partnership (2022)

Invited speaker:

- *Careers in science* seminar presentation and discussion – Girl Scouts of America (2021)
- *Entomology Careers* video interview and virtual lab tour – *STEM Fest (2021)*
- *Women in Education* panel – Philanthropic Education Organization State Convention, AZ, USA (2009 & 2010)
- *Science in Public Education* panel – Science Works for the Smart State Conference, QLD, Australia (2002)
- *Undergraduate international research* – Biomedical Research Abroad Vistas Open (BRAVO) orientation (2011)
- *Deciphering Research Literature in Insect Biology* ENT198/25 Department of Entomology and Nematology, UC Davis (Winter 2019). Research Scholars Program in Insect Biology students critically discussed two of my authored manuscripts and interviewed me about the research and writing process.
- *Introduction to the University of California* FRS001/6 UC Davis. First-year students interviewed me about the role of postdoctoral scholars in the university (2017)
- *Women in Science for Gympie State High School* – University of Queensland (2003)

Certified training & workshops attended:

- *What is compassionate management?; How to keep your team motivated; Trauma Informed Lens elearning 10; Land Use Environment Group - Unconscious Bias in Hiring; From Me to We - A Diversity and Inclusion Training Virtual Session*, County of San Diego (Learning Management System trainings, 2021)
- *Action Steps Toward Racial Justice*, Lunch and Learn, UC Davis Health (virtual, 2020)
- *Mental Health Gatekeeper*, Certified Training, Occupational Health Services, UC Davis (2017)
- *UndocuAlly Program for Educators*, Certified Training, UC Davis AB450 & Undocumented Student Resource Center (2017)
- *Inclusive Mentorship*, workshop, Student Disabilities Center UC Davis (2018)
- Women in Life Sciences at Davis, discussion groups (2018): *Issues facing female scientists during conferences, Mental health awareness and strategies, Non-traditional academic careers, Conference code of conduct and harassment, Conflict resolution*
- *Impostor syndrome*, workshop, GradPathways UC Davis (2016)
- *International Student Graduate Assistants in Teaching*, Certified Training, University of Arizona (2009)

RESEARCH ROTATIONS

Ecology & Evolutionary Biology, University of Arizona (research project, 2009) Advisor: NA Moran

Entomology, University of Arizona (research project, 2008 – 2009) Advisor: X Li

Entomology, University of Arizona (research project, 2008) Advisor: MS Hunter

Conservation Volunteers Australia Yellow Crazy Ant Eradication Project with CSIRO and Dhimurru Aboriginal Land Management (remote-location ant surveyor; 2008)

Institute for Molecular Bioscience, University of Queensland (research project, 2005) Advisor: JL Martin

Life Sciences, The University of Queensland (research project, 2004) Advisor: SL O’Neill

RESEARCH MEETING PARTICIPANT

Best Practices in R. Davis Institute for Data Science, UC Davis (2018)

Intro to Shell, Git, and R. Berkeley Institute for Data Science, UC Berkeley (2018)

Data Management Workshop. UC Agriculture and Natural Resources IGIS Statewide Program, UC Berkeley (2016)

Association of Applied IPM Entomologists Citrus Roundtable, Exeter, CA, USA (2017, 2016)

Department of Pesticide Regulation Symposium, Sacramento, CA, USA (2017)

9th Annual Graduate Student Symposium in Ecology, Davis, CA, USA (2016)

National Institute of Food and Agriculture (NIFA) Summit on Data in Agricultural Science (via Webinar; 2016)
Entomological Society of America Pacific Branch Meeting, Tucson, AZ, USA (2014)
Center for Insect Science Hexapodium, Tucson, AZ, USA (2008, 2009, 2010, 2011, 2012, 2013, 2014)
Undergraduate Biology Research Program Annual Conference, Tucson, AZ, USA (2013, 2012)
European Union Cooperation in Science and Technology (EU COST) Action FA0701 Meeting "Arthropod Symbiosis: from fundamental studies to pest and disease management", Ile d'Oléron, France (2012)
2nd Nematode-Bacteria Symbioses (NEMASYM) Research Coordination Network Meeting, Tucson, AZ, USA (2010)
Entomological Society of America Annual Meeting, San Diego, CA, USA (2010)
Graduate and Professional Student Council 17th Annual Student Showcase, Tucson, AZ, USA (2009)
The Department of Primary Industries Revolutionary Science Forum, Brisbane, QLD, Australia (2007)
International Congress of Entomology, Brisbane, QLD, Australia (2004)

PROFESSIONAL SOCIETIES

Entomological Society of America (2010, 2014 – 2020)
American Association for the Advancement of Science (2010 – 2013)
University of Arizona Insect and Arachnid Society (2011)

LANGUAGES

English (native speaker), Spanish (conversational)