

PERSONAL INFORMATION

Irene María Serrano Valdivia, PhD

Laboratoire des Interactions Plantes-Microorganismes

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CURRENT POSITION

2015- **AgreenSkills Postdoctoral Fellow.** Laboratoire des Interactions Plantes-Microorganismes, Toulouse, France.

ACADEMIC RECORDS

2010 **Ph.D. in Biology (*summa cum laude*) with European mention.** Department of Biochemistry, Molecular and Cell Biology of Plants, Estación Experimental del Zaidín (EEZ), Spanish National Council for Scientific Research (CSIC)/University of Granada, Spain.

2009 **First Certificate in English.** Cambridge University, England.

2006 **M.S. Agricultural Science (*summa cum laude*).** Department of Biochemistry, Molecular and Cell Biology of Plants, Estación Experimental del Zaidín (EEZ)/University of Granada, Spain.

2004 **Bs.C in Biology.** University of Jaén, Spain.

PROFESSIONAL EXPERIENCE

2015- **AgreenSkills Postdoctoral Fellow.** Laboratoire des Interactions Plantes-Microorganismes, Toulouse, France.

2010-2015 **Postdoctoral Research Associate.** Indiana University, College of Arts and Science, Bloomington, IN, USA.

2009 **Visiting Graduate Research Assistant.** Agricultural Research Institute of the Hungarian Academy of Sciences, Martonvasar, Hungary.

Visiting Graduate Research Assistant. Institute of Plant Genetics and Biotechnology, Slovak Academy of Sciences, Nitra, Slovak Republic.

2008 **Visiting Graduate Research Assistant.** Instituto Valenciano de Investigaciones Agrarias, Valencia, Spain

Visiting Graduate Research Assistant. Agricultural Research Institute of the Hungarian Academy of Sciences, Martonvasar, Hungary.

Visiting Graduate Research Assistant. Institute of Plant Genetics and Biotechnology, Slovak Academy of Sciences, Nitra, Slovak Republic.

Visiting Graduate Research Assistant. Embrapa Recursos Genéticos e Biotecnología Brasília, Brasil

2007 **Visiting Graduate Research Assistant.** Agricultural Research Institute of the Hungarian Academy of Sciences, Martonvasar, Hungary.

Visiting Graduate Research Assistant. Institut de Recherche Pour le Développement (IRD), Montpellier, France.

- 2006** **Visiting Graduate Research Assistant.** Institut de Recherche Pour le Développement (IRD), Montpellier, France.
- 2005-2010** **Graduate Research Assistant.** Department of Biochemistry, Molecular and Cell Biology of Plants, Estación Experimental del Zaidín (EEZ), High Council for Scientific Research (CSIC), Granada, Spain.
- 2004** **Internship, Environmental Technician.** Town Hall of Andújar, Spain.

RESEARCH FELLOWSHIPS/CONTRACTS AWARDED

- 2015** **AgreenSkills International Postdoctoral Fellowship.** Laboratoire des Interactions Plantes-Microorganismes (INRA), Toulouse, France.
Source of funding: European Union.
- 2010-2014** **Full-time Postdoctoral Research Associate.** Indiana University, College of Arts and Science, Bloomington, IN, USA.
Source of Funding: National Institute of Health (NIH), USA.
- 2009** **Research Scholarship for short stay.** Agricultural Research Institute of the Hungarian Academy of Sciences, Martonvasar, Hungary.
Source of funding: Spanish National Council for Scientific Research (CSIC)/Hungarian Academy of Sciences (HAS).
Research Scholarship for short stay. Institute of Plant Genetics and Biotechnology, Slovak Academy of Sciences, Nitra, Slovak Republic.
Source of funding: Spanish National Council for Scientific Research (CSIC)/Slovakian Academy of Sciences (SAS).
- 2008** **Research Scholarship for short stay.** Instituto Valenciano de Investigaciones Agrarias, Valencia, Spain
Source of Funding: Ministry of Education and Science.
Research Scholarship for short stay. Agricultural Research Institute of the Hungarian Academy of Sciences, Martonvasar, Hungary.
Source of funding: *Source of funding:* Spanish National Council for Scientific Research (CSIC)/Hungarian Academy of Sciences (HAS).
Research Scholarship for short stay. Institute of Plant Genetics and Biotechnology, Slovak Academy of Sciences, Nitra, Slovak Republic.
Source of funding: *Source of funding:* Spanish National Council for Scientific Research (CSIC)/Slovakian Academy of Sciences (SAS).
Research Scholarship for short stay. Embrapa Recursos Genéticos e Biotecnología, Brasília, Brasil
Source of funding: *Source of funding:* Andalucía Government, Spain
- 2007** **Research Scholarship for short stay.** Agricultural Research Institute of the Hungarian Academy of Sciences, Martonvasar, Hungary.
Source of funding: *Source of funding:* Spanish National Council for Scientific Research (CSIC)/Hungarian Academy of Sciences (HAS).
Research Scholarship for short stay. Institut de Recherche Pour le Développement (IRD), Montpellier, France.
Source of Funding: Ministry of Education and Science.
- 2006** **Research Scholarship for short stay.** Institut de Recherche Pour le Développement (IRD), Montpellier, France.

Source of Funding: Ministry of Education and Science.

2005-2008 **Doctoral Thesis Fellowship.** Department of Biochemistry, Molecular and Cell Biology of Plants, Estación Experimental del Zaidín (EEZ), High Council for Scientific Research (CSIC).

Source of funding: Formación de Profesorado Universitario (FPU) Fellowship, Spanish Ministry of Education and Science.

2004 **Internship, Environmental Technician.** Town Hall of Andújar, Spain.

Source of Funding: University of Jaén.

GRANTS AND HONORS

2014 **International Society of Molecular Plant-Microbe Interactions Travel Award** for attending the XVI International Congress on Molecular Plant-Microbe Interactions, Rhodes, Greece.

Indiana University Travel Award for Women in Science for attending the XVI International Congress on Molecular Plant-Microbe Interactions, Rhodes, Greece.

2010 **European Union Seventh Framework Program for Research (FP7) travel award** for attending the course: "Climate change: challenge for training of applied plant scientist. Challenge for Plant Breeding and the Biotech Response", Martonvasar, Hungary.

2009 **Spanish Microscopy Society Grant** to attend the first Joint Meeting of the Spanish and the Portuguese Microscopy Societies, Segovia, Spain.

Spanish Microscopy Society Grant to attend the course "Cryomethods in Microscopy and their Applications in the Study of Biological Material", Murcia, Spain.

2008 **Scientific Grant of the Andalucía Government** (Spain) for Short Research Stay at Embrapa Recursos Genéticos e Biotecnología, Brasília, Brasil.

PARTICIPATION IN RESEARCH GRANTS/PROJECTS

2014-2015 **New roles for innate immunity during seed development in Arabidopsis thaliana**
Funding Entity: New roles for innate immunity during seed development in Arabidopsis thaliana.

2010-2014 **Programmed cell death and disease resistance in Arabidopsis**

Funding Entity: National Institute of Health (NIH), USA.

2009-2013 **Harnessing plant reproduction for crop improvement. FA0903**

Funding Entity: European Cooperation in Science and Technology.

2009-2010 **Studies on the genes responsible for microspore embryogenesis and investigations on the pollen-pistil interaction in cereals. 2008HU0012**

Funding Entity: *Source of funding:* *Source of funding:* Spanish National Council for Scientific Research (CSIC)/Slovakian Academy of Sciences (SAS).

2008-2011 **Molecular and cellular basis of pollen behavior interacting with the pistil in olive (*Olea europaea* L.). AGR-01791**

Funding Entity: Andalusian Regional Government, Spain.

2008-2009 **Programmed Cell Death in Plant Reproduction. 2007 SK 0001**

Funding Entity: *Source of funding:* *Source of funding:* Spanish National Council for Scientific Research (CSIC)/Slovakian Academy of Sciences (SAS).

- 2007-2011** **European Research Training Programme: Climate change - challenge for training of applied plant scientists EU-FP7-REGPOT 2007-1 (AGRISAFE 203288)**
Funding Entity: European Cooperation in Science and Technology
- 2007-2008** **Whole mount *in situ* hybridisation for studying genes involved in microspore embryogenesis. 2006HU0004**
Funding Entity: Spanish National Council for Scientific Research (CSIC)/Hungarian Academy of Sciences (HAS).
- 2006-2009** **Role of S-RNAses and TRX h in self-incompatibility mechanism in olive. BFU2006-09876/BFI**
Funding Entity: Ministry of Education and Science, Spain.
- 2004-2006** **Cambios en la estructura y composición de las paredes celulares como consecuencia de la interacción polen-pistilo en el olivo. PL2004-001**
Funding Entity: Spanish Agency for International Development Cooperation.
- 2002-2005** **Pollen-pistil interactions and their implications in olive production**
Funding Entity: Ministry of Education and Science, Spain.

LANGUAGES

Spanish: mother tongue.

English: fluent written and spoken (FCE, Cambridge University).

Italian: fluent spoken.

French: basic knowledge.

OTHER EXPERIENCE AND PROFESSIONAL MEMBERSHIPS

Teaching Experience

- 2009** **Confocal Microscopy and its applications in plants.** Spanish Microscopy Society/University of Murcia/Leica. Murcia, Spain.

Students supervision

- 2014-** Matthew Neubauer, Graduate Student.
- 2014** Isaiah Sloss, STEM program Fellow, Undergraduate Research.
Brooklyn Sloss, STEM program Fellow, Undergraduate Research.
- 2013-** Renae Comulada, Graduate Student.
Fawaz Hasnain, Undergraduate Research.
- 2011-2012** Christian J. Hansen, Hutton Honors Fellow, Undergraduate Research
- 2011** Abigail Cesnik, Eli Lilly Undergraduate Fellow, Undergraduate Research.

Peer-reviewed Publications

9. Serrano I*, Romero-Puertas M, Sandalio LM, Olmedilla A. 2014. Involvement of reactive oxygen species and nitric oxide in programmed cell death associated with self incompatibility in plants. *Journal of Experimental Botany*, doi: 10.1093/jxb/erv083.

Article selected for cover picture.

***Corresponding author.**

8. Serrano I, Gu Y, Dubiella U, Innes RW. 2014. The Arabidopsis Enhanced Disease Resistance 1 Protein Kinase Negatively Regulates the ATL1 E3 Ubiquitin Ligase To Suppress Cell Death. *Plant Cell*, 26: 4532-4546.

7. Argueso C, Fishman M, Huot B, Panya K, **Serrano I**, Mudgett MB, Innes RW. 2014. A formal summary of the XVI International Congress on Molecular Plant–Microbe Interactions, Rhodes, Greece, July 2014. *Molecular Plant-Microbe Interactions*, 27(11): S1-S5.
6. **Serrano I**, Olmedilla A. 2012. Histochemical location of key enzyme activities involved in receptivity and self-incompatibility in the olive tree (*Olea europaea* L.). *Plant Science* 197:40-49.
5. **Serrano I**, Romero-Puertas MC, Rodríguez Serrano M, Sandalio LM, Olmedilla A. 2012. Role of peroxynitrite in programmed cell death induced in self-incompatible pollen. *Plant Signaling and Behavior*. 7:779-781.
4. **Serrano I**, Romero-Puertas MC, Rodríguez-Serrano M, Sandalio LM, Olmedilla A. 2012. Peroxynitrite mediates programmed cell death both in papillar cells and in self-incompatible pollen in the olive (*Olea europaea* L.). *Journal of Experimental Botany* 63:1479-1493.
3. **Serrano I**, Pelliccione S, Olmedilla A. 2010. Programmed-cell-death hallmarks in incompatible pollen and papillar stigma cells of *Olea europaea* L. under free pollination. *Plant Cell Reports*, 29:561-572.
2. **Serrano I**, Suárez C, Olmedilla A, Rapoport HF, Rodríguez-García MI. 2008. Structural organization and cytochemical features of the pistil in olive (*Olea europaea* L.) cv. Picual at anthesis. *Sexual Plant Reproduction*, 21:99-111
1. Suárez C, **Serrano I**, Rapoport HF, Olmedilla A, Rodríguez-García MI. 2005. Behaviour of stigma before and after pollination in olive tree (*Olea europaea* L.). *Acta biologica Cracoviensia. Series botanica*, 47(1).

Participation in International Conferences

Oral presentations

- 2014** **Irene Serrano**, Yangnan Gu, Roger Innes. *Negative regulation of and E3 ubiquitin ligase by the EDR1 protein kinase suppresses cell death*. XVI International Congress on Molecular Plant-Microbe Interactions, Rhodes, Greece.
- 2010** **Irene Serrano**, Katalin Jäger, Adela Olmedilla. *Pollen development alterations associated to male sterility in the olive (*Olea europea* L.) cv. Farga*. Harnessing Plant Reproduction for Crop Improvement COST FA0903, Bristol, England.
- Irene Serrano**, Adela Olmedilla. *Changes induced by pollination in the olive pistils*. Harnessing Plant Reproduction for Crop Improvement COST FA0903, Bristol, England.
- 2009** **Irene Serrano**, María Rodríguez-Serrano, Luisa María Sandalio, Adela Olmedilla. *Detection of PCD and ROS production in pollen-pistil interactions in *Olea europaea**. Joint Congress of the Spanish and Portuguese Microscopy Societies, Segovia, Spain.
- Salvatore Pelliccione, **Irene Serrano**, Antonio Serrato, Mariam Sahrawy, Adela Olmedilla. *In situ* localization techniques for the evaluation of the role of thioredoxins in plant reproduction. Joint Congress of the Spanish and Portuguese Microscopy Societies, Segovia, Spain.
- 2006** **Irene Serrano**, Cynthia Suárez, Adela Olmedilla, Hava F. Rapoport, M^a Isabel Rodríguez-García. *Caracterización de las etapas tempranas de floración en el olivo: desarrollo del polen y pistil*. XV International Symposium of Palynology, Benalmádena, Spain.

Adela Olmedilla, **Irene Serrano**, Cynthia Suárez, Hava F. Rapoport, M^o Isabel Rodríguez-García. Stigma development in olive. XIXth International Congress on Sexual Plant Reproduction, Budapest, Hungary.

Posters

- 2012** **Irene Serrano**, Roger Innes. *A dual regulatory role of Arabidopsis EDR1 in ER stress and defense responses*. Plant Biology 2012, Austin, TX, USA.
- 2011** **Irene Serrano**, Yangnan Gu, Roger Innes. *Determining a possible role of EDR1 in autophagy*. 17th International Conference on Arabidopsis Research, Madison, WI, USA.
- 2010** **Irene Serrano**, Maria Romero-Puertas, María Rodríguez-Serrano, Luisa M^a Sandalio, Adela Olmedilla. *Peroxynitrite mediates programmed cell death induces by pollen-pistil interaction in Olea europea L.* XXI International Congress on Sexual Plant Reproduction, Bristol, England.
- 2008** **Irene Serrano**, Amada Pulido, Antonio Serrato, Mariam Sahrawhy, Adela Olmedilla. *Thioredoxins h in pollen-pistil interactions in olive (Olea europaea L.)*. XX International Congress on Sexual Plant Reproduction, Brasilia, Brasil.
Irene Serrano, María Rodríguez-Serrano, Luisa María Sandalio, Adela Olmedilla. *PCD and ROS in pollen-pistil interactions in Olea europea L.* XX International Congress on Sexual Plant Reproduction, Brasilia, Brasil.
- 2005** Cynthia Suárez, **Irene Serrano**, Hava F. Rapoport, Adela Olmedilla y María Isabel Rodríguez-García. *Behavior of stigma before and after pollination in olive tree (Olea europaea L.)*. XII International Conference on plant Embryology, Cracow, Poland.

Participation in National Conferences

Oral presentations

- 2007** Salvatore Pelliccione, **Irene Serrano**, Adela Olmedilla, M^a Isabel Rodríguez García. *Estudio celular y ultraestructural de la evolución de la superficie del estigma de olivo durante la polinización*. XXIII Reunión Bienal de la SME. Bilbao, Spain.
Irene Serrano, M^a Isabel Rodríguez-García, Adela Olmedilla. *Granos de polen y fecundación en olivo: detección de muerte celular*. XXIII Reunión Bienal de la SME. Bilbao, Spain.

Posters

- 2005** **Irene Serrano**, Amada Pulido, Adela Olmedilla y María Isabel Rodríguez-García. *Inmunolocalización de pectinas y AGPs en pistilos de olivo tras la polinización*. XXII Reunión Bienal de la SME. Granada, Spain.

Invited talks

- 2014** **Irene Serrano**. *Negative regulation of and E3 ubiquitin ligase by the EDR1 protein kinase suppresses cell death*. Advance in Molecular Biology for young researchers working abroad. Madrid, Spain.

Memberships

- 2013-** Member of the International Society for Molecular Plant-Microbe Interactions
2005- Member of the Spanish Microscopy Society.

Scientific reviewer

International Journal of Molecular Sciences.
Cellular Microbiology.
Science of the Total Environment.
International Journal of Biometeorology.
Annals of Agricultural and Environmental Medicine.
Theoretical and Applied Climatology.
Agricultural and Forest Meteorology.
Palinology.
Aerobiologia.

Advanced Courses Attended

- 2013** **Introduction to Genetics and Evolution.** Duke University, Durham, USA.
Statistics: Making Sense of Data. University of Toronto, Toronto, Canada.
- 2010** **Climate change: challenge for training of applied plant scientist. Challenge for Plant Breeding and the Biotech Response.** Sponsored European Union FP7 Agrisafe, Martonvasar, Hungary.
- 2009** **Cryomethods in Microscopy and their Applications in the Study of Biological Material.** Microscopy Service of University of Murcia/Spanish Society of Microscopy/Leica, Murcia, Spain.
- 2008** **Bioinformatics for Users IV.** Centro de Edafología y Biología Agraria del Segura (CEBAS), Murcia, Spain.
- 2007** **Environmental Consulting**
Confederation of Businessmen of Andalusia (CEA), Granada, Spain.
- 2006** **XXII Course of Vegetal Histochemistry.** Centro de Ciencias Medioambientales, Madrid, Spain.
- 2005** **Genetically Modified Food.** Complutense University of Madrid, El Escorial, Madrid, Spain.
Theory and Practical Course in Electron Microscopy: techniques and application to Transmission Electron Microscopy. Isaza. Granada, Spain.
XLII International Course in Edafology and Soil Fertilization. National Council for Scientific Research (CSIC)/ Spanish Agency for International Development Cooperation (AECID). Estación Experimental del Zaidín (EEZ), Granada, Spain.

AREAS OF EXPERTISE

Plant Reproduction, plant-pathogen interactions, plant development & signalling, plant cell biology, molecular plant physiology, microscopy (epifluorescence & CLSM, TEM, SEM, cyoTEM).

PRACTICAL SKILLS

- RNA and DNA extraction and purification; RT-PCR amplification; qRT-PCR gene expression analysis; gene ligation and cloning techniques (classic ligation and Gateway cloning) for DNA replication and protein expression; to make genetic constructions and to transform them into different *Escherichia coli* and yeast strains; stable transformation of *Arabidopsis thaliana* using *Agrobacterium tumefaciens*; generation of knockdown *Arabidopsis thaliana* lines by artificial micro-RNAs; plasmid DNA purification by mini, midi and maxi-preps; DNA fragments enzymatic restriction analysis.

- Transient expression in *Nicotiana benthamiana*; isolation and transfection of *Arabidopsis thaliana* protoplasts for protein expression; *in vitro* kinase assay (³²P-ATP); *in vitro* ubiquitination assay; recombinant protein purification (6xHis-tag, GST-tag, MBP-tag); SDS-PAGE; Phos-tag gels; bidimensional electrophoresis; western blotting.

- Pathogenicity assays: bacterial growth curve (syringe and dip inoculation methods); quantification of fungal infection, quantification of hypersensitive response by ion leakage: cell death detection by trypan blue.

- Preparation of samples for light and Transmission Electron Microscopy (TEM); ultrastructure tissue preservation and analysis and antigens immunolocalization; sample analysis with different microscopy techniques: light microscopy, TEM and Scanning Electron Microscopy (SEM); localization of gene products by immunocytochemistry; detection of subcellular protein markers to distinguish cellular organelles.

- Analysis processing (image segmentation, deconvolution, etc...), and 3D reconstruction of microscopy images; sequence alignments and analysis tools; phylogenetic sequence analysis; gene and protein databases; protein subcellular prediction software; protein features and conservation analysis software; protein structure prediction based in amino acid sequence.

REFERENCES

Dr. Susana Rivas

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Prof. Dr. Roger Innes

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Dr. Adela Olmedilla

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E-18008 Granada (Spain)
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Dr. Florence Vignols

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