Roberto A. Gaxiola
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CURRICULUM VITAE

Roberto A. Gaxiola

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EDUCATION

- 1988 – 1991. Ph.D. (Ruprecht-Karls University of Heidelberg)"Isolation and characterization of genes of the yeast *Saccharomyces cerevisiae* involved in salt tolerance mechanisms". Examiners: Prof. Dr. Kai Simons, Prof. Dr. Thomas Graf, Prof. Dr. Mark Stitt, and Prof. Dr. Wieland Huttner. Supervisor: Prof. Dr. Ramon Serrano. Group leader at the European Molecular Biology Laboratory (EMBL). Heidelberg, Germany. Fellowship: Deutscher Akademischer Austauschdienst (DAAD) and EMBL fellowship.
- 1983 – 1987. Master in Science "*Saccharomyces cerevisiae* as an eukaryotic model for the study of the molecular mechanisms that allow life in hypersaline environments." Supervisor: Dr. Samuel Zinker Department of Genetics and Molecular Biology Centro de Investigacion y de Estudios Avanzados. I.P.N. Mexico City. Fellowship: CONACyT, Mexico.
- 1978 -1982. Bachelor in Science with Major in Biochemical Engineering at the Instituto Tecnologico y de Estudios Superiores de Monterrey ITESM. Unidad Guaymas. Guaymas Son, Mexico.

EMPLOYMENT and PROFESSIONAL POSITIONS

- 2007- present. Assistant Professor, School of Life Sciences. Cellular and Molecular Biosciences group, Arizona State University.
- 2000 – 2007. Assistant Professor, Plant Molecular Genetics. Department of Plant Science, University of Connecticut.
- 1998 – 1999. Postdoctoral fellow in the laboratory of Dr. Seth L. Alper at the Beth Israel Deaconess Medical Center, Harvard Medical School. Note: I work at this postdoctoral position during my last year at the Whitehead Institute.

- 1995 – 1999. Visiting Scientist in the laboratory of Dr. Gerald R. Fink at the Whitehead Institute for Biomedical Research (MIT).
- 1993 – 1995. Associated Researcher "C" Leader of the research project: "A functional approach to salt tolerance. " Funded by CONACyT and the European Commission (International Scientific Cooperation). Plant Molecular Biology Department. Instituto de Biotecnologia, UNAM Cuernavaca Morelos, Mexico.
- 1992 – 1993. Postdoctoral fellow in the laboratory of Prof. Dr. Ramon Serrano at the Department of Biotechnology. University of Valencia, Spain.

HONORS AND AWARDS

- 2009 – present. Primary Advisor for the ASU branch of Sigma Alpha Lambda Honors Society (a national honors society involved in Service Academics and Leadership).
- October 1st, 2002. 2nd Place in the Technology Innovation Competition event organized by Connecticut Innovations Inc.
- 1995 - 1997. Fellowship: Pew Latin American Fellows Program.
- 1992 - 1993. Fellowship: Ministerio de Educacion y Ciencia Madrid, Spain.
- 1988 –1991. Fellowship: Deutscher Akademischer Austauschdienst (DAAD).
- 1988 -1991. Fellowship: European Laboratories for Molecular Biology EMBL fellowship.

RESEARCH GRANTS

ACTIVE

- 01/12/2012 – 12/31/2014. Collaborative Research: Integrating two different roles of the proton-pumping pyrophosphatase in the regulation and efficiency of carbon utilization and transport in planta". NSF. Total Amount Awarded: $ 380,000. PI (principal Investigator).
- 10/01/2011 – 09/30/2012. "Transgenic Vegetables for Fertilizer Use Efficiency". University of Arizona. Total Amount Awarded: $34,000.00. Co-PI among two.
- 10/01/2011 – 09/30/2012. "Screening Potential Lettuce Breeding Lines for Improved Nutrient Use Efficiency". University of Arizona. Total Amount Awarded: $ 12,000.00. Co-PI among two.
- 01/01/2012 – 12/31/2012. "Exploring the Potential of Transgenic Crops for Improved Fertilizer Use Efficiency". University of Arizona. Total Amount Awarded: $44,000.00. Co-PI among two.

PENDING

- 01/06/2012 – 05/31/2015. "BREAD: Modification of cassava source/sink and carbon/nitrogen relationships to enhance storage root biomass and nutritional value". NSF. Requested Amount: $1,352,460.00. Co-PI among three.
  *This proposal was not funded, however, we will resubmit it in the next cycle considering that the panel recommendation was "**Outstanding"**.*

- 10/01/2012 - 09/30/2015. "Developing A Genetic Path To Climate Adaptation For Resource Intensive Vegetable Crops". USDA. Requested Amount: $750,000.00. PI.
  This proposal was not funded and received a low grade by the panel. It appears that the proposed work with transgenic plants was not a good match for this specific announcement. We will carefully evaluate the proposal and prepare a new version for next cycle.

- 02/01/2013 – 01/31/2018. "Advancing Food Security Through Nutrient Sustainability In Agriculture" USDA. Requested Amount: $4,864,361.00. Co-PI among twelve.
  This proposal was recommended for funding with Medium Priority but did not rank high enough for an award. The team will follow reviewers' suggestions and resubmit in the next cycle.

COMPLETED

- 6/01/2010 – 5/31/2011. Individual and combined effects of transgenes conferring drought and salt tolerance in rice" The Consortium for Plant Biotechnology Research, Inc. Grant Total: $ 77,799. Total awarded amount for Roberto Gaxiola: $13,889 for one year. Co-PI among three.
- 9/01/2008 – 8/31/2010. Engineering Cotton for Higher Salt and Drought Tolerance. USDA CSREES NRI Plant Responses to the Environment. Grant Total $320,707.00. Total awarded amount for R. Gaxiola: $98,460. Co-PI among four.
- 8/01/2006 – 7/31/2009. H^+-PPase AVP1 and Root Growth. USDA CSREES NRI Developmental Processes of Agricultural Plants. Direct cost $330,000. PI.
- 10/01/2006 – 9/30/2008. Root Engineering of Rice via the Overexpression of the Arabidopsis H^+-PPase. USDA HATCH Direct Cost $26,248. PI.
- 10/01/2004 – 9/30/2006. Overexpression of the H^+-PPase AVP1 as a strategy to improve plant growth under limiting phosphate conditions. USDA HATCH Direct Cost $22,070. PI.
- 1/01/2005 – 12/31/2005. US-Pakistan Workshop. NSF Direct Costs $37,400. Co-organizer of the workshop with Dr. Kauser Malik from Pakistan.

- 6/30/2003 – 1/06/2005. Transformation of Bermuda grass with LTB-Vp1-0-SEKDEL. USDA CERV Direct Cost $68,262. Co-PI among two.
- 6/01/2004 – 5/31/2005. Overexpression of the Vacuolar H^+-PPase (AVP1) Enhances Phosphorus Nutrition in *Arabidobsis thaliana*. University of Connecticut Research Foundation. Direct Cost $6,797. PI.
- 10/01/2003 – 9/30/2004. Evaluation of Salt and Drought Tolerant Phenotypes in Transgenic Arabidopsis and Tomato Plants. USDA HATCH Direct Cost $18,557. PI.
- 2/02/2003. Expression Studies By Real-Time Polymerase Chain Reaction – Request for Equipment. Biology of Plant-Microbe Associations program CSREES USDA Direct Cost $ 20,000. Co-PI among three.
- 9/15/2001 – 8/30/2005. Engineering salt and drought tolerant plants. Plant Responses to the Environment program CSREES USDA Direct Cost $145,000. PI.
- 1/01/1993 – 12/31/1995. A functional approach to salt tolerance. Granted by the European Commission (International Scientific Cooperation) Direct Cost 150,000 Euros. Co-PI among two.

PUBLICATIONS

Principal Investigator = **R. A. Gaxiola.** Research mentored by R. A. G: Undergraduate students = U; Graduate students = G; Postdoctoral fellows; Visiting Scientist = VS.

Publications per year = 1992 (1); 1993 (1); 1994 (1); 1995 (0); 1996 (2); 1997 (0); 1998 (2); 1999 (2); 2000 (0); 2001 (2); 2002 (1); 2003 (1); 2004 (1); 2005 (3); 2006 (0); 2007 (2); 2008 (0); 2009 (0); 2010 (1); 2011 (3); 2012 (2).

Total Citations = 1,763. H-index = 16.

- Julio Paez-Valencia*, Jonathan Lares-Sanchez[U]*, Ellen Marsh, Liane T. Dorneles[VS], Mirella P. Santos[VS],Tara Furstenau[G], Alexander Winter[U], Sean Murphy[U], Jennifer Cox[U], Marcin Trzaska[U], Jason Metler[U], Charles A. Sanchez[VS], Arnoldo Francana, Daniel Schachtman, and **Roberto A. Gaxiola**. (2013) Enhanced H^+-PPase activity improves nitrogen use efficiency in Romaine Lettuce (*Lactuca sativa* cv. conquistador). Plant Physiology. 161: 1557-1569.

- **Roberto A. Gaxiola**, Charles A. Sanchez[VS], Julio Paez-Valencia, and James J. Elser (2012). H^+-PPases and Pi limitation. Genetic Manipulation of a "Vacuolar" H^+-PPase: From Salt Tolerance to Yield Enhancement Under Phosphorus-Deficient Soils. Plant Physiology. 159: 1-9.
  (R. G. was invited to submit this peer-reviewed up-date to the Plant Physiology journal. He wrote the final version of the manuscript and was the corresponding author responsible for content and editorial decisions). Impact factor = 6.451 Citations to date = 0.

- S. Undurraga[G], M. P-Santos[VS], J. Paez-Valencia, H. Yang[G], P.K. Hepler, A.R. Facanha, K.D. Hirschi, **R. A. Gaxiola**. (2012) Arabidopsis sodium dependent and independent phenotypes triggered by H+-PPase up-regulation are SOS1 dependent. Plant Science. 183: 96-105.

(R.G. wrote the manuscript and directed the research of one postdoctoral fellow, one visiting scientist and two graduate students involved in this publication. R.G. was the corresponding author responsible for content and editorial decisions). Impact factor = 2.481. Citations to date = 0.

- Zhang H., Shen G., Kuppu S., **Gaxiola R. A.,** Payton P. (2011) Creating drought-and salt-tolerant cotton by overexpressing a vacuolar pyrophosphatase gene. Plant Signaling & Behavior **6:** 1 -3.
  (R.G. discussed with Dr. Zhang the interpretation of the data to write the conclusions of the manuscript). Impact factor = 2.784 Citations to date = 0

- Paez-Valencia J, Patron-Soberano A, Rodriguez-Leviz A, Sanchez-Lares J[U], Sanchez-Gomez C, Valencia-Mayoral P, Diaz-Rosas G, **Gaxiola R. A.** (2011) Plasma membrane localization of the type I H^+-PPase AVP1 in sieve element-companion cell complexes from Arabidopsis thaliana. Plant Science 181: 23 – 30.
  (R.G. wrote the manuscript and directed the research of one postdoctoral fellow and an undergraduate student. R.G. was the corresponding author responsible for content and editorial decisions). Impact factor = 2.481. Citations to date = 0.
  Note: *This article was graded 8 "Must read" on May 12th, 2011 by R. Serrano from Faculty of 1000.*

- **Gaxiola R. A.,** Edwards M, Elser JJ. (2011) A transgenic approach to enhance phosphorus use efficiency in crops as part of a comprehensive strategy for sustainable agriculture. Chemosphere 84: 840 – 845.
  (R.G. wrote the sections corresponding to plant physiology and genetic approach ca 60% of the review. R.G. was the corresponding author responsible for content and editorial decisions). Impact factor = 3.155. Citations to date = 2.

- Pasapula, V., Shen, G., Kuppu, S., Paez-Valencia, J., Mendoza, M[U]., Hou, P., Chen, J., Qui, X., Zhu, L., Zhang, X., Auld, D., Blumwald, E., Zhang, H., **Gaxiola, R. A.,** Payton, P. (2010) Expression of an Arabidopsis vacuolar H^+-pyrophosphatase gene (AVP1) in cotton improves drought- and salt tolerance and increases fibre yield in field conditions. Plant Biotechnology Journal, Vol. 9, pp 88 - 99.
  (R.G. designed 30% of the experiments and provided the AVP1 technology, R.G. students obtained 30% of the data). Impact factor = 4.886. Citations to date = 3.

- Haibing Yang[G], Jane Knapp, Pratistha Koirala[U], Divya Rajagopal, Wendy Ann Peer, Lawrence K. Silbart, Angus Murphy and **Roberto A. Gaxiola**. (2007) Enhanced phosphorus nutrition in monocots and dicots overexpressing a phosphorus-responsive type I H^+-pyrophosphatase. Plant Biotechnology Journal. Vol. 5, pp 735-745.
  (R.G. designed 80% of the experiments, R.G. students obtained 80% of the data and R.G. was the corresponding author responsible for content and editorial decisions). Impact factor = 4.886. Citations to date = 17.

- **Gaxiola R. A**, Palmgren M. G., Schumacher K. (2007) Plant proton pumps. FEBS Letters **581:** 2204-2214.
  (R.G. co-wrote the revision with MG. P. and K.S. R.G. was the corresponding author responsible for content and editorial decisions). Impact factor = 3.601. Citations to date = 58.

- Sunghun Park, Jisheng Li[G], Jon K. Pittman, Gerald A. Berkowitz, Haibing Yang[G], Soledad Undurraga[G], Jay Morris, Kendal D. Hirschi, and **Roberto A. Gaxiola.** (2005) Up-regulation of a H^+-pyrophosphatase (H^+-PPase) as a strategy to engineer drought-resistant crop plants. *Proc. Natl. Acad. Sci* Vol. 102 pp 18830-18835.
  (R.G. designed 70% of the experiments; R.G. graduate students obtained 70% of the data. R.G. was the corresponding author responsible for content and editorial decisions). Impact factor = 9.771. Citations to date = 52.
  Note: *This article was graded 4.8 "Must Read" on May 4th, 2006 by K. Davis and R. Serrano from Faculty of 1000.*
  Note: *This paper was discussed in an article " Relief for parched plants" by Carrie Arnold published in The Scientist. October 14th, 2010.*

- Li J[G], Yang H[G], Peer WA, Richter G, Blakeslee JJ, Bandyopadhyay A, Titapiwantakun B, Undurraga S[G], Khodakovskaya M, Richards EL, Krizek BA, Murphy AS, Gilroy S, **Gaxiola R.A.** (2005) Arabidopsis H^+-PPase AVP1 Regulates Auxin Mediated Organ Development. Science **310:** 121 – 125.
  (R.G. designed 70% of the experiments, R.G. graduate students obtained 70% of the data. R.G. was the corresponding author responsible for content and editorial decisions). Impact factor = 31.377. Citations to date = 113.
  Note: *This article was graded 9 "Exceptional" on October 18th, 2005 by Ramon Serrano from Faculty of 1000.*

- Brini, F., **Gaxiola, R. A.**, Berkowitz, G.A., and Masmoudi, K. (2005) Cloning and characterization of wheat vacuolar cation/proton antiporter and pyrophosphatase proton pump. Plant Physiology and Biochemistry Vol. 43 pp 347 – 354.
  (R.G. designed 80% of the experiments and provided most of the biological reagents used in this work. R.G. co-wrote this manuscript with G. B.). Impact factor = 2.402. Citations to date = 33.

- Richard W. Mercier, Natasha M. Rabinowitz, Rashid Ali, **Roberto A. Gaxiola**, Gerald A. Berkowitz. (2004) Yeast hygromycin sensitivity as a functional assay of cyclic nucleotide gated cation channels. Plant Physiology and Biochemistry Vol. 42 pp 529-536.
  (R.G. designed 50% of the experiments and co-wrote the manuscript with G.B.). Impact factor = 2,402. Citations to date = 15.

- R. Serrano, C. Montesinos, **R. A. Gaxiola**, G. Rios, J. Forment, M. Leube, J.M. Mullet, M.A. Naranjo, M. Roldan, O. Vicente, R.A. Kanhonou, A.

Rausell and R. Ros. (2003) Functional Genomics of Salt Tolerance: the Yeast Overexpression Approach. Acta Hort Vol. 609 pp 31-38.
(R.G. and R. S. designed the main strategy for the isolation and identification of genes involved in salt tolerance in yeast.). Impact factor = 2.13 Citations to date = ND

- Serrano, R; **Gaxiola, R. A.**, Rios, G; Forment, J; Vicente, O; Ros, R. (2003) Salt stress proteins identified by a functional approach in yeast. MONATSHEFTE FUR CHEMIE Vol 134 Issue: 11 Pages: 1445-1464.
(R.G. contributed to the pioneer design and testing of functional screenings to identify salt-tolerant yeast mutants via transformation of multicopy libraries). Impact factor = 1.356. Citations to date = 7.

- **Roberto A. Gaxiola**, Gerald R. Fink, and Kendal D. Hirschi. (2002) Genetic Manipulation of Vacuolar Proton Pumps and Transporters. Plant Physiology Vol. 129 pp. 967-973.
(R.G. co-wrote this update with K.H. and G.F. and was the corresponding author responsible for content and editorial decisions). Impact factor = 6.451. Citations to date = 53.

- **Roberto A. Gaxiola**, Jisheng, Li[G], Soledad Undurraga[G], Lien M. Dang, Gethyn J. Allen, Seth L. Alper, and Gerald R. Fink. (2001) Drought- and Salt-Tolerant Plants Results from Overexpression of the AVP1 H^+-Pump. *Proc. Natl. Acad. Sci* Vol.98 no.20 pp11444-11449.
(R.G. designed 90% of the experiments, R.G. and his graduate students obtained 90% of the data, R.G. was the corresponding author responsible for content and editorial decisions). Impact factor = 9.771. Citations to date = 174.
Note: *Ricki Lewis published in The Scientist on March 4, 2002 an article on " Using Transgenesis to Create Salt-tolerant Plants" that highlighted our discoveries.*

- Andrew C. Diener, **Roberto A. Gaxiola**, and Gerald R. Fink. (2001) Arabidopsis *ALF5*, a Multidrug Efflux Transporter Gene Family Member, Confers Resistance to Toxins. The Plant Cell, Vol. 13, pp1625-1637.
(R.G. designed 10% of the experiments and obtained 10% of the data). Impact factor = 9.396. Citations to date = 59.

- Zentella R, Mascorro-Gallardo J.O[G], Van Dijck P, Folch-Mallol J, Bonini B, Van Vaeck C, **Gaxiola R. A.**, Covarrubias AA, Nieto-Sotelo J, Thevelein JM, Iturriaga G. (1999) A *Seraginella lepidophylla* Trehalose-6-Phosphate Synthase Complements Growth and Stress-Tolerance Defects in a Yeast *tps1* Mutant. Plant Physiology Vol 119(4) pp 1473-1482.
(R.G. discussed data with J. M. and G. I.). Impact factor = 6.451. Citations to date = 60.

- **Roberto A. Gaxiola**, Rajini Rao, Amir Sherman, Paula Grisafi, Seth L. Alper and Gerald R. Fink. (1999) The *Arabidopsis thaliana* proton

transporters, AtNhx1 and Avp1, can function in cation detoxification in yeast. *Proc. Natl. Acad. Sci*.Vol.96 pp 1480-1485.
(R.G. designed 75% of the experiments, obtained 75% of the data and wrote the first draft of the manuscript). Impact factor = 9.771. Citations to date = 250.

- Christian Luschnig, **Roberto A. Gaxiola**, Paula Grisafi and Gerald R. Fink. (1998) EIR1, A Root Specific Protein Involved in Auxin Transport, is Required for Gravitropism in *Arabidopsis thaliana*. Genes and Development Vol 12 No.14 pp 2175-2187.
(R.G. designed the experiments related to the utilization of the S. cerevisiae mutant gef1 to test auxin transport in yeast, this data were instrumental to provide the first experimental evidence for a plant auxin transporter EIR1 in vivo). Impact factor = 12.889. Citations to date = 338.

- **Roberto A. Gaxiola**, Daniel Yuan, Richard Klausner and Gerald R. Fink. (1998) The Yeast CLC Chloride Channel Functions in Cation Homeostasis. *Proc. Natl. Acad. Sci*. Vol 95 pp 4046-4050.
(R.G. designed 60% of the experiments, obtained 60% of the data and wrote the first draft of the manuscript). Impact factor = 9.771. Citations to date = 110.

- **Roberto A. Gaxiola**, Matilde Corona and Samuel Zinker (1996) A Halotolerant Mutant of *Saccharomyces cerevisaei* Journal of Bacteriology. Vol.178, No. 10. pp 2978-2981.
(R.G. designed 90% of the experiments, obtained 90% of the data and wrote the first draft of the manuscript). Impact factor = 3.726. Citations to date = 2.

- J.O. Mascorro-Gallardo, A.A. Covarrubias and **R. A. Gaxiola** (1996) "Construction of a CUP1 promoter-based vector to modulate gene expression in *Saccharomyces cerevisiae*. GENE *172,* pp169-170.
(R.G. advised the directed the research of a graduate student wrote the final version of the manuscript and was the corresponding author responsible for content and editorial decisions). Impact factor = 2.266. Citations to date = 35.

- Serrano, R., & **R. A. Gaxiola.** (1994) Microbial models and salt stress tolerance in plants. CRC Critical Reviews in Plant Sciences *13,* 121-138.
(R.G. co-wrote the revision with R. S.). Impact factor = 3.821. Citations to date = 136.

- Glaser, H. U., Thomas, D., **Gaxiola, R. A.**, Montrichard, F., Surdin-Kerjan, Y., and Serrano, R. (1993) Salt tolerance and methionine biosynthesis in Saccharomyces cerevisiae involve a putative phosphatase gene. Embo J *12,* 3105-10.
(R.G. designed 60% of the experiments and obtained 60% of the data). Impact factor = 10.124. Citations to date = 95.

- **Gaxiola, R**.**A**., de Larrinoa, I. F., Villalba, J. M., and Serrano, R. (1992) A novel and conserved salt-induced protein is an important determinant of salt tolerance in yeast. Embo J *11,* 3157-64.

(R.G. designed 50% of the experiments, obtained 90% of the data, and wrote the first draft of the manuscript). Impact factor = 10.124. Citations to date = 151.

MANUSCRIPTS IN PREPARATION

- "H^+-PPase AVP1 is involved in vascular differentiation in *Arabidopsis thaliana".* Julio Paez-Valencia, Araceli Patron-Soberano, Concepcion Sanchez-Gomez, Jonathan Sanchez-Lares[U], Tara Fustenau[G], Matthew Hilton[U], Claudia Polanowski[U], Pedro Valencia-Mayoral, Bryan Ayre, Kendal Hirschi and **Roberto A. Gaxiola.** *(This manuscript will be submitted to Nature by October 2012).*

- "The H^+-PPase AVP1 is required for sucrose transport from source to sink tissues". Paez-Valencia, Julio**;** Jonathan Sanchez[U], Brian Ayre, Sunghun Park, Kendal Hirschi and **Gaxiola, Roberto A.** *(The key transgenic plants required for this manuscript have been generated and a full characterization will require of about one full year of work, we aim to submit this manuscript by February 2013 to Science.)*

BOOK CHAPTERS

- A.T. Fuglsang, J. Paez-Valencia, **R.A. Gaxiola**, Plant Proton Pumps: Regulatory Circuits Involving H^+-ATPase and H^+-PPase, Transporters and Pumps in Plant Signaling, Signaling and Communication in Plants vol. 7, Springer - Verlag, Heidelberg, 2011, pp. 39 - 64.

INVITED NON-PEER REVIEWED PUBLICATIONS

- 2007. Article on "Plants of Saline Environments" published in the McGraw-Hill Yearbook of Science & Technology.
- May 2006. Article on " Root Engineering: A Strategy for Agriculture in Marginal Areas of Cultivation" published in the ISB News Report.
- 2003. Article on "Salt Tolerance in Plants" published in the McGraw-Hill Yearbook of Science & Technology.
- November 2001. Article on " Engineering a Shared Pathway to Salt and Drought Tolerance in Plants" published in the ISB News Report.

PATENTS PUBLISHED

- May 1st, 2012. **Gaxiola R.A.,** Fink, G.R. and Alper, S.L. "Transgenic pollen expressing exogenous plant vacuolar pyrophosphatase and methods for increasing seed production in plants". Patent Number- 08168864.
- August 23rd, 2011. **Gaxiola R.A.,** Fink, G.R. and Alper, S.L. "Transgenic Plants Overexpressing a Plant Vacuolar Pyrophosphatase". Patent No.: US8,003,852 B2.
- November 15th, 2011. **Gaxiola R.A.,** Fink, G.R. and Alper, S.L. " Plant Cells and Plants Overexpressing Vacuolar Proton Pyrophosphatases". US 8,058,515 B2.

- November 19th, 2009. **Gaxiola R.A.,** Fink, G.R. and Alper, S.L. "Transgenic Plants Overexpressing a Plant Vacuolar Pyrophosphatase". Patent No.: US 2009/0288222 A1 United States Patent.

TECHNOLOGY LICENSED

- July 2006 – present. Research License Agreement between the University of Connecticut and SYNGENTA Seeds, Inc. USA.
- June 2004 - present. Research License Agreement between the University of Connecticut and Via-lactia Biosciences (New Zealand) Limited.

PATENTS PENDING

- "Proton Transporters and Uses in Plants". Provisional # 60/226,233 filed on 08/18/00. Inventor: **Roberto A. Gaxiola,** Seth L. Alper and Gerald R. Fink.
- "Stress-resistant Oversized Transgenic Plants Capable of Growing in Salinized Soil". PCT/US00/30955 filed on 11/10/00. Inventors **Roberto A. Gaxiola,** Seth L. Alper and Gerald R. Fink.
- "Enhanced Meristematic Activity by Overexpression of a Tonoplast Pyrophosphatase". PCT/US01/09548 filed on 03/24/01. Inventors: **Roberto A. Gaxiola,** Seth L. Alper and Gerald R. Fink.
- "Methods for Imparting Desirable Phenotypic Traits, Including Drought, Freeze and High Salt Tolerance and methods for Increasing Seed Production". PCT/US01/41806 filed on 08/20/01. Inventors: **Roberto A. Gaxiola,** Seth L. Alper and Gerald R. Fink.
- Invention disclosure "Drought tolerant turfgrass by expressing Arabidopsis AVP1 gene." NCSU 05-027. Inventors Rongda Qu, **Roberto A. Gaxiola** and Shujie Dong.

PUBLISHED ABSTRACTS AND POSTERS

Research mentored by **Roberto A. Gaxiola**: Undergraduate students = U ; Graduate students = G; Postdoctoral fellows; Visiting Scientist = VS.

- Julio Paez-Valencia, Araceli Patron-Soberano, Concepcion Sanchez-Gomez[4], Jonathan Sanchez-Lares[1], Tara Furstenau[G], Matthew Hilton[G], Pedro Valencia-Mayoral, Brian G. Ayre, Kendal D.Hirschi, and **Roberto A. Gaxiola.** P06028 "H^+-PPase AVP1 is necessary for phloem development in *Arabidopsis thaliana"*. Plant Biology 2012 Austin, Texas July 22-24th.
- Aswad Khadikar, Brian G. Ayre, and **Roberto A. Gaxiola**. P16035 "Proton-pumping pyrophosphatase AVP1 functions in the phloem to regulate rates of transport". Plant Biology 2012 Austin, Texas July 22-24th.
- Julio Paez-Valencia, Araceli Patron-Soberano, Concepcion Sanchez-Gomez, Jonathan Sanchez-Lares[U], Claudia Polanowski[U], Pedro Valencia-Mayoral[3], **Roberto A. Gaxiola.** PO4016 "H^+-PPase AVP1 is involved in

vascular differentiation in *Arabidopsis thaliana".* Plant Biology 2011 Minneapolis August 6 – 10th.

- Julio Paez-Valencia, Jonathan Sanchez[U], Jungeun Park, Sunghun Park, Kendal Hirschi, Brian Ayre and **Roberto A. Gaxiola.** P01006 "Evaluating the improved plant biomass caused by enhanced type I proton-pumping pyrophosphatase (H+-PPase) activity". Plant Biology 2010 Joint Annual Meetings of the American Society of Plant Biologists and the Canadian Society of Plant Physiologists - La Société Canadienne de Physiologie Végétale Montreal,Canada. July 31st – August 4th.
- Julio E. Paez-Valencia, Jonathan Sanchez[U], Marisol Mendoza[U], Alexander Winter[U] and **Roberto A. Gaxiola.** "Transgenic plants over-expressing H^+-PPases: A new strategy to improve plant biomass, mineral nutrition and abiotic stress tolerance". XII Meeting of the Brazilian Society of Plant Physiology. September 7th – 12th 2009.
- Julio E. Paez-Valencia, Divya Rajagopal and **Roberto A. Gaxiola**. "Manipulation of proton gradients and their effects in plant nutrition and biomass formation." XVI IPNC. August 26th – 30th 2009.
- Zhang, Hong; Shen, Guoxin; Pasapula, Vijaya; Kuppu, Sundaram; Qin, Hua; Zhu, Longfu; Qiu, Xiaoyun; Hou, Pei; Chen, Jian; Zhao, Xingyu; Banjara, Manoj; Zhu, Yinfeng; Hu, Rongbin; **Gaxiola, Roberto A.**; Blumwald, Eduardo; Payton, Paxton. "Improving drought tolerance in crops" Plant Biology 2009 Abstract # Z8982.
- Pasapula Vijaya, Yan Juqiang, He Cixin, Blumwald Eduardo, **Gaxiola Roberto A.** and Zhang Hong. "Expression of an Arabidopsis vacuolar sodium/proton antiporter gene (AtNHX1) and an Arabidopsis vacuolar H^+-pyrophosphatase gene (AVP1) in cotton to increase tolerance to drought and salt stresses" Plant Biology 2006 Abstract # P08001.
- Soledad Undurraga[G] and **Roberto A. Gaxiola**. "Simultaneous Overexpression of the Vacuolar Transporters AVP1 and AtNHX1 Improves Parental Salt Tolerance" Plant Biology 2006 Abstract # P08007.
- Yang Haibing[G], Knapp Jane, Murphy Angus and **Roberto A. Gaxiola**. "The type I H+-PPase AVP1 functions at the intersection of auxin signaling and Pi sensing to mediate root architecture plasticity". Plant Biology 2006 Abstract # P12011.
- Haibing Yang[G], Jane Knapp, Angus Murphy and **Roberto A. Gaxiola**. "The Type I H^+-PPase AVP1 Functions at the Crossroads Between Low Pi Sensing, Enhanced Auxin Sensitivity and Root Architecture Plasticity". The 2nd Pan American Plant Membrane Biology Workshop. May 17th – 20th, 2006.
- Hong Zhang, Cixin He, Dick Auld, Eduardo Blumwald and **Roberto A. Gaxiola.** "Engineering cotton for higher drought- and salt-tolerance" STRATEGIES FOR SUCCESS 2006. Beltwide Cotton Conferences.
- Yang, H[G]., Knapp, J.E., **Gaxiola, R.A.** " Overexpression of the vacuolar H^+-pyrophosphatase AVP1 enhances phosphorus uptake in *Arabidopsis thaliana*" Plant Biology 2005 Abstract # 218.

- Li, J[G]., Yang, H[G]., Lopez, L., Richter, G., Blakeslee, J., Bandyopadhyay, A., Peer, W., Titapiwantanakun, B., Undurraga[G], S., Murphy, A., Gilroy, S., **Gaxiola, R.A.** " The H^+-PPase AVP1 Is Required for Organ Development in Arabidopsis" Plant Biology 2005 Abstract #669.
- Yang, H[G]., Knapp, J.E., **Gaxiola, R.A.** " Overexpression of the vacuolar H^+-pyrophosphatase AVP1 enhances phosphorus uptake in *Arabidopsis thaliana*" Plant Biology 2005 Extended Abstract #11003 selected for presentation in Minisymposium 1 on Mineral Nutrition and Salinity.
- Li, J[G]., Yang, H[G]., Lopez, L., Richter, G., Blakeslee, J., Bandyopadhyay, A., Peer, W., Titapiwantanakun, B., Undurraga[G], S., Murphy, A., Gilroy, S., **Gaxiola, R.A.** " The H^+-PPase AVP1 Is Required for Organ Development in Arabidopsis" Plant Biology 2005 Extended Abstract #19001 selected for presentation in Minisymposium 9 on Auxin.
- Undurraga, S[G]., **Gaxiola, R.A.** " Interaction between *sos1* Mutation and *AVP1* Overexpression in *Arabidopsis thaliana*: Evidence for an Epistatic Effect and a Role in Potassium Nutrition" Plant Biology 2004 Abstract #203.
- Undurraga, S[G]., **Gaxiola, R.A.** "Interaction between *sos1* Mutation and *AVP1* Overexpression in *Arabidopsis thaliana*: Evidence for an Epistatic Effect and a Role in Potassium Nutrition". Plant Biology 2004 Extended Abstract #43003 selected for presentation in Minisymposium 22 on Salinity.
- Li, J[G]., **Gaxiola R.A.** "Over-expression of the vacuolar H^+-PPase AVP1 increases cell proliferation and de novo organogenesis in Arabidopsis" Plant Biology 2003 Abstract #90.
- Undurraga, S[G]., **Gaxiola, R.A.** " Interaction between *sos1* Mutation and AVP1 overexpression in Arabidopsis: Evidence for an epistatic effect" Plant Biology 2003 Abstract #177.
- **Gaxiola, R.A.,** Berkowitz, G., Li, J[G]., Undurraga, S[G]., Yang, H[G]., Sunghun, P., Morris, J., Pittman, J., Hirschi, K.D. " Ectopic overexpression in tomato of the Arabidopsis *AVP1* gene results in drought tolerance". Plant Biology 2003 Abstract #231.
- Yang, H[G]., **Gaxiola R. A.** " Up-regulation of the vacuolar H^+-pyrophosphatase AVP1 improves grow in limiting K+ and PO_4^{3-}media". Plant Biology 2003 Abstract #435.
- Brini, F., Masmoudi, K., **Gaxiola, R.A.,** Berkowitz, G. A. " Cloning and characterization of wheat vacuolar cation/proton antiporter and pyrophosphatase proton pump". Plant Biology 2003 Abstract #1283.
- Rabinowitz, N., Mercier, R., **Gaxiola, R.A.,** Berkowitz, G. A. " Functional characterization of inwardly K-conducting plant cyclic nucleotide gated channels using a *trk1*, *trk2* yeast mutant". Plant Biology 2003 Abstract #1285.
- Berkowitz, G., **Gaxiola, R. A.** " Development of a novel high-throughput assay to identify and characterize inwardly conducting Na channels and

use to demonstrate Na conductance of a plant cyclic nucleotide gated channel". Plant Biology 2003 Abstract #1292.

- **Gaxiola, R. A.,** Li, J[G]., Undurraga, S[G]., Yang, H[G]. " Genetic manipulation of a pyrophosphatase-driven vacuolar H+-pump (AVP1): Impact on nutrition, growth and development, and plant response to abiotic stress". Plant Biology 2003 Abstract #11004.
- Li, J[G]., **Gaxiola, R. A**. "Over-expression of the vacuolar H^+-pump AVP1 positively affects growth and development in Arabidopsis". Plant Biology 2002 Abstract #349
- Fink, G. R., Alper, S.L., **Gaxiola, R.A**., Li, J.[G], Undurraga, S[G]. "Increased size, salt and drought tolerance in *A. thaliana* over-expressing AVP1 vacuolar H^+-pyrophosphatase". Plant Biology 2001 Abstract #340
- Li, J[G]., Undurraga, S[G]., Alper, S., Fink, G. and **R. A. Gaxiola.** "Overexpression of a Tonoplast H^+-pump Increases Biomass and Tolerance to Abiotic Stresses in Transgenic Plants". 12th International Conference on Arabidopsis Research 2001.

NATIONAL & INTERNATIONAL INVITED LECTURES

- August 22nd – 24th, 2012. Lecture on "Exploring the Potential of Transgenic Crops for Improved Water and Fertilizer Use Efficiency" At the 1st Congreso Internacional de Biotecnologia Agropecuaria de la Universidad Nacional Abierta y a la Distancia –UNAD. Pereira, Colombia.
- May 16th, 2012. Lecture on "H^+-PPase AVP1 is necessary for phloem development in *Arabidopsis thaliana*." At the 4th Pan American Plant Membrane Biology Workshop. Asilomar Conference Grounds, Pacific Grove, CA, USA.
- April 20, 2011. Lecture on "Reevaluating the role of the H^+-PPase in plant growth and development". As part of the seminar series of The Arkansas Center for Plant-Powered Production (The P3 Center). Jonesboro, AR, USA.
- February 14, 2011. Lecture on " Bulking Up: Making Plants Bigger and Better". As part of the seminar series of the Instituto de Biotecnologia, Universidad Autonoma de Mexico. Cuernavaca Mor. Mexico.
- February 3 – 5, 2011. Lecture on "A transgenic approach to enhance phosphorus use efficiency in crops as part of a comprehensive strategy for sustainable agriculture" Frontiers in life sciences: Sustainable phosphorus summit. Arizona State University, Tempe Arizona.
- November 1st – 5th, 2010. Lecture on "Integrating the *in planta* roles of the proton-pumping pyrophosphatase in the regulation and efficiency of carbon utilization and transport". VII Encuentro Latinoamericano y del Caribe sobre Biotecnologia Agropecuaria REDBIO Mexico 2010. Guadalajara Jal. Mexico.

- September 30th - October 3rd, 2010. Lecture on "Bulking Up:Making Plants Bigger and Better". Society for the Advancement of Chicano and Native America Scientists (SACNAS) conference in Anaheim, California.
- June 6th – 11th, 2010. Lecture on "Engineering H^+-PPases in Plants". 2010 FASEB Summer Research Conferences. Transport ATPases: From Molecules to Maladies. Snowmass Village, Colorado.
- September 24, 2009. Lecture on "Transgenic Plants Over-expressing H+-PPases: A New Strategy to Improve Plant Biomass, Mineral Nutrition and Abiotic Stress Tolerance". As part of the Seminar series of the Department of Biological Sciences, University of North Texas, Denton TX. USA.
- September 7th – 12th 2009. Lecture on "Transgenic plants over-expressing V-PPases: a new strategy to enhance plant biomass and stress tolerance". XII Meeting of the Brazilian Society of Plant Physiology "Challenges for Food Production and Bioenergy" at Fortaleza, Ceara, Brazil.
- August 26th – 30th 2009. Lecture on "Manipulation of proton gradients and their effects in plant nutrition and biomass formation." XVI International Plant Nutrition Colloquium "Healthy Plants ~ Healthy Planet" at Sacramento California.
- March 12, 2009. Lecture on "Manipulation of proton gradients and their effects in plant nutrition and biomass formation." Children's Nutrition Research Center Seminar at Baylor College of Medicine Seminar Series. Houston Texas.
- March 12, 2009. Lecture on "Manipulation of proton gradients and their effects in plant nutrition and biomass formation." The Department of Horticultural Sciences Texas A&M.
- May 17 to 20, 2008. Lecture on "Understanding the role of H^+-PPases in auxin transport". XXXVII Annual Meeting of SBBq and XI Congress of the PABMB at Aguas de Lindoia, Sao Paolo, Brazil.
- December 8th, 2007. Lecture on "Understanding the role of H^+-PPases in plant responses to abiotic stress, nutrition and development". International Symposium on Plant Membrane Transport "New developments of Membrane transporter research" at the University of Tokyo, Japan.
- November 11-15, 2007. Keynote Lecture on "Root Engineering: A Strategy for Agriculture in Marginal Areas of Cultivation". XII Congreso de Bioquimica y Biologia Molecular de Plantas from the Sociedad Mexicana de Bioquimica at Veracruz, Mexico.
- November 4-5, 2007. Lecture on "Root Engineering: A Strategy for Agriculture in Marginal Areas of Cultivation". USA-Pakistan Symposium on Plant Stress Biology at University of California, Davis, USA.
- October 22- 26, 2007. Lecture on "Root Engineering: A Strategy for Agriculture in Marginal Areas of Cultivation". VI Encuentro Latinoamericano y del Caribe de Biotecnologia Agropecuaria, at Vina del Mar, Chile.

- June 26 – 30, 2007. Lecture on The H^+-PPase AVP1 facilitates auxin transport and auxin-dependent development in Arabidopsis". XIV International Workshop Plant Membrane Biology at the Universidad Politecnica de Valencia, Spain.
- December 11th – 13th, 2006. Lecture on "Enhanced salt and drought tolerance via the up-regulation of a type I H^+-PPase in agricultural relevant". International Meeting on Biotic and Abiotic Stress Responses in Plants at the International Centre for Genetic Engineering & Biotechnology, New Delhi, India.
- October 25, 2006. Lecture on "H^+-PPases in plants". Plant Biology Fall Seminar Series at the Samuel Roberts Noble Foundation, Inc., USA.
- September 11, 2006. Lecture on Effects of AVP1 up-regulation in tomato plants". "Plant Biology Program, PennState University, USA.
- May 17th – 20th, 2006. Chair of the session on Nutrient Deficiencies. The 2nd Pan American Plant Membrane Biology Workshop. South Padre Island, Texas, USA.
- June 19th – 21st, 2006. Invited as an International Expert with the lecture on "The role of the H^+-PPase AVP1 in salt and drought tolerance". ICGEB – TWAS Joint Plant Biotechnology Program International Workshop on Plant Tolerance to Abiotic Stress. Pontificia Universidad Catolica de Chile. Santiago, Chile.
- September 13th, 2006. Department of Plant, Soil and Insect Science, University of Massachusetts, Amherst, MA. USA.
- July 29th 2005. Instituto de Biologia Molecular y Celular de Plantas, Universidad Politecnica de Valencia, Spain.
- 17 – 23 July 2005. XVII International Botanical Congress. Vienna, Austria, Europe.
- 16 -20 July 2005. Plant Biology 2005. Seattle, Washington USA.
- 28 -31 March, 2005. Co-organizer of the meeting. International Conference on Biotechnology for Salinity & Drought Tolerance in Plants. Pakistan Academy of Science, Islamabad, Pakistan.
- January 27th, 2005. Department of Horticulture and Landscape Architecture, Purdue University, West Lafayette, IN.
- December 2nd, 2004. Department of Plant Sciences, University of Cambridge, Cambridge, UK.
- 24 – 28 July 2004. Chair of the Minisymposium on Salinity. Plant Biology 2004, Lake Buena Vista, Florida USA.
- 13 – 18 June 2004. The Gordon Research Conference on Salt and Water Stress in Plants. Hong Kong, China.
- April 7th, 2004. Department of Plant Biology, University of Illinois, Urbana, IL. USA.
- February 19th, 2004. Department of Biological Sciences, University of Missouri – Columbia, Columbia, MO. USA.

- 3 – 7 November 2003. XI National Congress of Biochemistry and Molecular Biology of Plants & 5th Symposium Mexico – USA. Acapulco Guerrero, Mexico.
- October 16th, 2003. Bio-Science Complex Seminar Series, University of Connecticut, Storrs, USA.
- 25 – 30 July 2003. Chair of the Minisymposium on Nutrient Biology. Plant Biology 2003, Honolulu, Hawaii USA.
- March 13th, 2003. The Forsyth Institute, Department of Developmental and Craniofacial Biology, Harvard University. Boston, MA. USA.
- June 20th, 2002. Zentrum Fur Molekularbiologie der Planzen, Universitat Tubingen, Tubingen, Germany.
- April 11th, 2002. Plant Biology Graduate Program; Spring 2002 Seminar Series, University of Massachusetts, Ahmerst, MA. USA.
- May 31st, 2002. DEKALB Genetics Corp, Mystic, CT. USA.
- 27 – 30 October 2001. X National Congress of Biochemistry and Molecular Biology of Plants & 4th Symposium Mexico – USA. La Paz, Baja California Sur, Mexico.
- September 30th to October 4th, 2001. IV National Congress of Cellular and Molecular Biology of Fungi, Tequesquitengo Morelos, Mexico.
- 21 – 25 July 2001. Plant Biology 2001, Providence, RI, USA.
- February 9th, 2001. Department of Chemistry and Biochemistry, Worcester Polytechnic Institute, Worcester, MA, USA.
- October 12th, 2000. Department of Molecular and Cell Biology, University of Connecticut, Storrs, CT. USA.
- October 6th, 2000. Department of Animal Science, University of Connecticut, Storrs, CT. USA.
- 20 – 25 August 2000. The Gordon Research Conference on Cellular Basis of adaptation to Salt and Water Stress in Plants, Tilton, NH, USA.
- June 16th, 2000. Chairperson. Symposium in honor of Dr. Gerald R. Fink. Room 26-100 at MIT, Cambridge, MA, USA.

GRADUATE STUDENTS SUPERVISION

- At ASU. April 26th, 2012. Kamesh Regmi presented his Ph.D. project to his thesis committee (Dr. R. Gaxiola Chair; Dr. Martin F. Wojciechowski; Dr. Robert W. Roberson, and Kevin Redding).
- At ASU. April 5th, 2012. Tara Furstenau successfully defended her written and oral comprehensive exam.
- At ASU. February 17th, 2012. Tara Furstenau presented her Ph.D. project to her thesis committee (Dr. R. Gaxiola Chair; Dr. Hugh Mason, Dr. Tad Day, and Dr. Leslie Towill).
- At ASU. Fall 2010. Tara Furstenau begins her graduate work under my supervision.
- At ASU. Fall 2010. Kamesh Regmi begins his graduate work under my supervision.

- At ASU. Spring 2011. Jie-Jun Xi a visiting scholar from the School of Pastoral Agriculture Science and Technology Lanzhou University. He was funded by the China Scholarship Council to spend a year in my laboratory as part of his Ph.D. training program.
- Former. 2000 – 2004. Ph.D. student – Jisheng Li with the thesis entitled " Vacuolar H^+-Translocating Pyrophosphatase AVP1 Is Required for Organ Development in Arabidopsis". Dr. Li currently works as group leader at Ceres Inc. Southern Oaks, CA.
- Former. 2000 – 2006. Ph.D. student – Soledad Undurraga with the thesis entitled " Interaction of the H^+-PPase AVP1 with the Secondary Transporters AtNHX1 and SOS1 in *Arabidopsis thaliana*: Implications in Salt Tolerance and Mineral Nutrition". Dr. Undurraga is currently a postdoctoral fellow at University of Washington, Seattle.
- Former. 2002 – 2006. Ph.D. student – Haibing Yang with the thesis entitled " The type I H^+-PPase AVP1 functions at the crossroads between auxin transport, low phosphate sensing and root architecture plasticity". Dr. Yang was a postdoctoral fellow at Purdue University for three years and currently he has an "Administrative/Professional Staff" position at the same university.

POSTDOCTORAL FELLOWS SUPERVISED

- At ASU. 2008 – present. Postdoctoral fellow – Dr. Julio Paez-Valencia.
- At UCONN and ASU. 2006 – 2008. Postdoctoral fellow – Dr. Divya Rajagopal. Dr. Rajagopal is currently a postdoctoral fellow at Saskatoon Research Center, Canada.
- At ASU. 2007 – 2008. Postdoctoral fellow -- Dr. Srinivas Makam. Dr. Makam is currently a postdoctoral fellow at ASU.
- Former. 2003 – 2005. Postdoctoral fellow – Dr. Jane Knapp. Dr. Knapp retired from active research.

VISITING SCIENTIST

- At ASU. 2011 October – April 2012. Charles A. Sanchez; Director, Research Scientist and Professor, Yuma Agricultural Center, University of Arizona spent his sabbatical year in my laboratory. Our collaboration with Professor Sanchez allowed our laboratory to start the field trials with our AVP1-transgenic lettuce, potato, tomato, and cassava plants. We have submitted at least seven grant proposals, some of which have been funding and the other are still pending. Furthermore, the data gathered through this collaboration resulted in at least two manuscripts that are in preparation and the analysis of the field trial data that continue will produce a minimum of three more publications.
- At ASU. 2011 Dr. Mirella Santos came to my laboratory for a short visit (4 months) funded by the Brazilian Agency *Conselho Nacional de*

Desenvolvimento Cientifico e Tecnologico CNPq. She is co-author of one published paper and another in preparation.

MEMBER OF GRADUATE DISSERTATION COMMITTEES IN ASU

- April 30th, 2012. Research Proposal (for partial fulfillment of requirements for degree) for Vicki Moore from Dr. Willem Vermaas' laboratory.
- April 11th, 2012. Comprehensive exam for graduate student candidate Kathy Larrimore from Dr. Tsafir Mor's laboratory.
- 2009. Ph. D. Cyd E. Hamilton on "The effects of Endophyte Hybridization on Host Grass Performance". Chair of committee Dr. Stan Faeth and Dr. Thomas Dowling.
- 2009 – present. Ph. D. Vicki Moore on "Thylakoid membrane components and metabolic consequences". Chair of committee Dr. Wim Vermaas.
- 2009. Ph. D. Mrinalini Muralidharan on "Plant Serine Hydrolases and their Function". Chair of committee Dr. Tsafir Mor.
- 2008. Ph. D. Michael Dennis McConnell on "Biochemical and Biophysical Studies of Photosystem I in *Chlamidomonas reinhardtii*". Chair of committee Dr. Andrew N. Webber.
- 2008. Master of Natural Science in Biology Jing Yu on "Using DNA Computing to Solve Traveling Salesman Problem". Chair of committee Dr. Wayne D. Frasch.

MEMBER OF INTERNATIONAL GRADUATE DISSERTATION COMMITTEES

- 2010 - 2012. Ph. D. candidate Fabio Marcelo Idrovo Espin. Doctor en Ciencias Biologicas / Opcion Biotecnologia con el projecto "Caracterizacion Molecular de Homologos de TGA en Papaya y su Posible Relacion en la Defensa Contra Patogenos". Chair of the committee Dr. Dr. Jorge Manuel Santamaría Fernández. Centro de Investigacion Cientifica de Yucatan, Mexico.
- 2009. Maestro en Ciencias con Especialidad en Biologia Maria Eugenia Garcia Fierro on "Metabolic Phenotypes Generated by Changes in H^+-pyrophosphatase (AVP1) Expression in *Arabidopsis thaliana* Ecotype Columbia". Chair of committee Dr. Rocio Diaz de la Garza. Instituto Tecnologico y de Estudios Superiores de Monterrey, Mexico.
- 2009. Maestro en Ciencias con Especialidad en Biotecnologia de Plantas Naiby Faride Gamboa on "Transformacion de plantulas de cafeto (*Coffea arabica*) cultivadas in vitro con el gen *AVP1* de *Arabidopsis thaliana*". Chair of committee Dr. Manuel Martinez Estevez. Centro de Investigacion Cientifica de Yucatan, Mexico.

UNDERGRADUATE RESEARCH UNDER MY SUPERVISION IN ASU

- Spring 2012 BIO 495. Rachel L. Livingston " Characterization of AVP1 transgenic cassava plants".
- Spring 2012 MBB 495. Matthew T. Hilton " Genetic and physiological characterization of *Arabidopsis thaliana avp1-1* loss-of-function mutants expressing and phloem-specific *AVP1* chimera".
- Fall 2011 MBB 495. Jason Melter " Characterization of AVP1 transgenic cassava and potato plants". ***Co-author (see Manuscripts in preparation).***
- Fall 2011 MBB 499. Joseph Ruiz " Characterization of AVP1 transgenic cassava plants".
- Fall 2011 MBB 499. Jennifer Cox " Characterization of AVP1 transgenic cassava and potato plants". ***Co-author (see Manuscripts in preparation).***
- Spring 2011 Bio 499. Shawna Averbeck " Characterization of transgenic cassava and potato plants over-expressing the type I H^+-PPase AVP1 from *Arabidopsis thaliana"*.
- Spring 2011 MBB 495. Elizabeth Starks "Data recording from the physiological experiments performed to evaluate transgenic potato and cassava plants over-expressing the type I H^+-PPase AVP1 from *Arabidopsis thaliana"*.
- Spring 2011 Bio 495. Claudia Polanowski " Molecular characterization of transgenic Arabidopsis plants expressing tissue specific chimeras".
- Spring 2011 MBB 499. Jennifer Cox " Characterization of transgenic cassava and potato plants over-expressing the type I H^+-PPase AVP1 from *Arabidopsis thaliana"*.
- Spring 2011 MBB 495. Jason Melter " Characterization of transgenic cassava and potato plants over-expressing the type I H^+-PPase AVP1 from *Arabidopsis thaliana"*.
- Fall 2010 MBB 499. Marcin Trzaska " Characterization of transgenic cassava plants over-expressing the type I H^+-PPase AVP1 from *Arabidopsis thaliana*. ***Co-author (see Manuscripts in preparation).***
- Fall 2010 MBB 499. Jennifer Cox " Characterization of transgenic cassava plants over-expressing the type I H^+-PPase AVP1 from *Arabidopsis thaliana*.
- Fall 2009 MBB 484. Alexander Winter "Physiological characterization of AVP1-expressing lettuce plants". ***Co-author (see Manuscripts in preparation).***
- Spring 2009 MBB 484. Jonathan Sanchez "Evaluation of the expression of root specific ion transporters in control and *AVP1*OX Arabidopsis plants via Real Time PCR". ***Co-first author and co-author (see Manuscripts published and in preparation). He is currently a graduate student under the mentorship of Dr. Nancy Horton in the Department of Chemistry and Biochemistry at University of Arizona.***

- Fall 2008. Amanda Ellseworth SOLUR Apprentice "Characterization of Arabidopsis plant engineered to express a translational fluorescent fusion AVP1: Plumb".

- Fall 2008 and Spring 2009 MBB 484. Mikhail Paragas "Characterization of Arabidopsis lines expressing tissue specific AVP1:RNAi chimeras".
- Fall 2008 MBB 484. Sean Murphy "Characterization of lettuce plants engineered to express the type I H^+-PPase AVP1 from Arabidopsis thaliana". ***Co-author (see Manuscripts in preparation).***
- Fall 2008 MBB 484. Matthew Waters "PCR amplification of the PP_i binding site of AVP1 for a FRET-based *in vivo* PP_i sensor".
- Fall 2008 and Spring 2009 MBB 484. Thomas Garcia "Development of a protocol for paraffin embedding of Arabidopsis plant tissue".
- Fall 2008 and Spring 2009 MBB 484. Patrick Ortiz "Generation of a FRET-based *in vivo* PP_i sensor".
- Fall 2008 BIO 310. Ayesha Khan "*De novo* organogenesis in control and AVP1 overexpressing Arabidopsis thaliana cotyledons".

UNDERGRADUATE RESEARCH UNDER MY SUPERVISION IN UCONN

- Summer 2005. Melissa Grakowsky "Evaluating AVP1 Overexpression in Transgenic Poplar".
- Summer 2004. Andries Smigel UConn Summer Undergraduate Research Fund (SURF). "Expression of an Edible Vaccine for Foot-and-Mouth Disease in Forage Bermudagrass".
- Summer 2004. William Coppola UConn Summer Undergraduate Research Fund (**SURF**). "Interaction between sos1-1 and AVP1 overexpression in Arabidopsis thaliana: Evidence for an epistatic effect and a role in potassium nutrition".
- Summer 2001. Melanie Ktorides UConn Summer Undergraduate Research Fund (**SURF**). "Overexpression of the gene *AVP1* in tobacco and Arabidopsis plants".
- Summer 2001. Katharine Swetz UConn Summer Undergraduate Research Fund (**SURF**). "Can the overexpression of AVP1 rescue the *det3* mutant phenotype?"

GRADUATE COURSES IN ASU

- Spring 2012. Co-instructor for MCB Colloquium MCB 701.
- Plant Biology Journal Club: Plant Development: when molecules meet development. Spring 2011. (PLB 498/ PLB 591).
- Plant Biology Journal Club: Genetically Engineered Plants and Foods: A Scientific Perspective. Spring 2010. (PLB 498/ PLB 598).
- Spring 2008. Co-instructor of Seminar /Journal Discussion Group: "From anatomy to zinc fingers". (PLB 498/ PLB 591).
- Spring 2008 PBL 790. John Benedict took my Applied Genetic class (MBB 350) on Spring 2008 as a graduate student. He developed all course credits and an independent project on "Generation of transgenic Arabidopsis plants overexpressing AVP1 and six different membrane protein-GFP-labeled chimeras".

UNDERGRADUATE COURSES IN ASU

- Scheduled for Fall 2012. Plant Cell, Tissue, and Organ Function (BIO/PLB 394). **Note: I am preparing this class from scratch.**
- Every spring since 2008. Applied Genetics (MBB 350).
- Every fall since 2008. Co-instructor for Genetic Engineering and Society (MBB 343).
- Spring 2009. Co-instructor for the on line version of PBL 108 "Concepts in Plant Biology".
- Summer 2008. Developed an on line version of PBL 108"Concepts in Plant Biology".

GUEST LECTURES IN ASU

- Invited lectures for BIO 189. The purpose of these lectures is to describe my trajectory as a researcher to help engage junior students in scientific careers. Fall 2009, 2010 and 2011.
- Invited lecture for graduate class SOS 591: Sustainability of Global Nutrient Cycles on "Global Phosphorus Sustainability". Fall 2010.
- Invited lecture for BIO 351on Plant Development. Fall 2010.

COURSES TAUGHT IN UCONN

- 2000 – 2007. Introduction to Plant Science (4 credits).
- 2005 – 2007. Current Topics in Plant Biology (1 credit).
- 2003 – 2007. Plant Micro-propagation (3 credits).
- 2006-2007. Genetic Approaches for Crop Improvement. Independent study.

UNIVERSITY SERVICE ACTIVITIES

- March 3rd, 2012. Presentation of the talk "Power Plants for a Hungry World" during SOLS Night of the Open Door event.
- February 2nd 2012. Panelist on "Feed 8 Billion" a public discussion at Arizona State University.
- 2011 – present. Member of the Bio-energy Committee of the School of Life Sciences (SOLS).
- 2011 – present. Member of the SOLS Undergraduate Programs Committee.
- 2009 – 2012. Faculty Honors Advisor for Barrett, The Honors College at ASU.
- 2008 – 2010. Reviewer for the SOLUR Fellow Program.
- At ASU. 2008 – present. Floor captain/monitor for emergency evacuation procedures. At ASU. 2007 – present. SoLS Greenhouse Committee.
- Former. 2003 – 2006. College of Agriculture and Natural Resources Diversity Committee.

- Former. March 14th, 2005. Presentation for teachers and students of the Edwin. O. Smith High School.
- Former. March 28th, 2003. Presentation for College of Agriculture and Natural Resources Campus Visit for High School Students.
- Former. 3 -6 December 2000. Participation in the workshop "Coastal Management: An Interdisciplinary Approach". Jointly organized by the University of Connecticut, Office of International Affairs and the Universidad de los Lagos, Chile.

PROFESSIONAL SERVICE ACTIVITIES

- Roberto Gaxiola, Rep to Executive Committee, Western Section of the American Society of Plant Biologists on July 20, 2012. Austin Texas.
- April 2nd – 4th, 2012. Member of the NSF Processes Structure & Integrity – Plant Proposal Review Panel.
- April 21st, 2011 – present. Member of the editorial board of Frontiers Plant Science/ Frontiers in Plant Nutrition.
- March 15th to 16th, 2011. International *AdHoc* reviewer for the "Ministerio de Ciencia, Tecnologia e Innovacion Productiva de la Nacion FONCyT Buenos Aires Argentina.
- April, 2008. Member of the NSF Organism-Environment Review Panel.
- 2001 – present. Member of The American Society of Plant Biologists.
- March 25 – 28 2002. Panel member of the Plant Responses to the Environment, National Research Initiative Competitive Grants Program (NRICGP) USDA.
- Reviewed National Science Foundation NSF grants in the last 4 years (6).
- Evaluation of grant proposals for the Technology Foundation STW Open Technological Research Proposals from the Netherlands.
- Regular reviewer for the following scientific journals: Nature Biotechnology, PNAS, The Plant Cell, Plant Cell Reports, Plant Cell and Environment, Plant Physiology, Plant and Cell Physiology, Plant Journal, Plant Molecular Biology, Plant Biology, Planta, Plant Science, Plant Biotechnology Journal, Trends in Plant Science, FEBS, FEMS Yeast Research, Journal of Plant Growth Regulation, Plant and Soil, JBC, Journal of Experimental Botany, Chemosphere.
- 28 -31 March 2005. Member of the organizing committee for the International Conference on "Biotechnology for Salinity & Drought Tolerance in Plants" Pakistan Academy of Sciences, Islamabad, Pakistan.
- 8 -9 May 2003. Member of the organizing committee for the meeting on "Genetically Modified Foods" Dodd Conference Center, Storrs, CT, USA.