

## **Pamela M. Pennington Aycinena de Sánchez**

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Birth date: 8/8/1969

### **Education**

1998 Ph.D., Microbiology, University of Texas  
Health Science Center at San Antonio, USA

1991 B.S. Biology, Trinity University, San Antonio, Texas, USA

### **Major Scientific Achievement**

Through multidisciplinary research, I have developed innovative strategies to control Chagas disease. I am now applying similar strategies to control mosquitoes and insects of agricultural importance.

**Key Words:** Chagas disease, malaria, vector-borne diseases, paratransgenesis, vector control, ecology of vector-borne diseases, participatory action research, community-based vector control

### **Positions**

2016-present Director, Department of Biochemistry and Microbiology, Universidad del Valle de Guatemala, Guatemala

2012-present Professor, Department of Biochemistry and Microbiology, Universidad del Valle de Guatemala, Guatemala

2010-present Director, Center for Biotechnology Studies, Universidad del Valle de Guatemala, Guatemala

2007-2012 Director, Department of Biochemistry and Microbiology, Universidad del Valle de Guatemala, Guatemala

2000-2008 Guest Lecturer, Department of Biochemistry and Microbiology, Universidad del Valle de Guatemala, Guatemala

2002-present Researcher, Center for Health Studies, Universidad del Valle de Guatemala, Guatemala

2002-2003 Post-doctoral fellowship, Yale University, New Haven, CT, USA

2001-2002 Associate researcher, Center for Health Studies, Universidad del Valle de Guatemala, Guatemala

1998-2001 American Society for Microbiology Post-doctoral fellowship, Centers for Disease Control and Prevention, Atlanta, GA, USA

### **Committees and Memberships**

2017 Member, National Intersectoral Commission for Biotechnology, Guatemala

2016 Member, National Academy of Science, Guatemala

2016 Member, National Intersectoral Commission for Biotechnology, Guatemala

2014 Member, Association of Medical and Graduate Departments of Biochemistry

2013 Member, American Society for Microbiology

2012-present Member of the Board of Directors of Colegio Interamericano de Guatemala (secretary)

2012-present	Member of the National Intersectoral Commission for Chagas disease
2010-2012	Member of the Consulting Committee - National Science and Technology Council for Guatemala (CONCYT)
2010-2012	Member, American Society for Tropical Medicine and Hygiene
2004-2007	Member Biotechnology Intersectoral Commission, National Science and Technology Council for Guatemala (Secretary 2005, President 2006)

### Courses Taught

2012-2016- Bacterial Genetics and Physiology, Biochemistry and Microbiology Department, Universidad del Valle de Guatemala

2013-2015-Microbial Pathogenesis, Biochemistry and Microbiology Department, Universidad del Valle de Guatemala

2008 – Advanced Parasitology, Biochemistry and Microbiology Department, Universidad del Valle de Guatemala and Masters Program in Infectious Diseases, Roosevelt Hospital, Guatemala (joint course)

2005, 2007-Advanced Parasitology, Biochemistry and Microbiology Department, Universidad del Valle de Guatemala

2004- Molecular Diagnosis of Parasitic Diseases Workshop. Universidad del Valle de Guatemala.

2004- Bacterial Pathogenesis, course instructor and coordinator for the Masters Program in Infectious Diseases, Roosevelt Hospital, Guatemala

2000- Developed and implemented the Molecular Biology and Genetic Engineering laboratories, Biochemistry and Microbiology Department, Universidad del Valle de Guatemala

### Scientific Publications

V Monteón<sup>1</sup>, E Quen-Rámirez, V Macedo-Reyes, R Lopez, K Acosta-Viana, **P Pennington**, A Ramos-Ligonio (2016) Pre-exposure to faeces or saliva of *Triatoma dimidiata* decreases parasitemia in mice challenged with *Trypanosoma cruzi*: a description of the inflammatory reaction at the inoculation site. *Annals of Parasitology* 62: 209–219.

\***PM Pennington**, LA Messenger, J Reina, JG Juárez, GG Lawrence, EM Dotson, MS Llewellyn, C Córdón-Rosales (2015) The Chagas disease domestic transmission cycle in Guatemala: Parasite-vector switches and lack of mitochondrial co-diversification between *Triatoma dimidiata* and *Trypanosoma cruzi* subpopulations suggest non-vectorial parasite dispersal across the Motagua valley. *Acta Tropica* 151:80-87

\*De Urioste-Stone SM, **PM Pennington**, E Pellecer, TM Aguilar, G Samayoa, HD Perdomo, H Enríquez, JG Juárez (2015) Development of a community-based intervention for the control of Chagas disease based on peridomestic animal management: An Eco-bio-social perspective. *Transactions of the Royal Society of Tropical Medicine and Hygiene* 109, 159-167

\*Taracena ML, PL Oliveira, O Almendares, C Umaña, C Lowenberger, EM Dotson, GO Paiva-Silva, **PM Pennington** (2015) Genetically modifying the insect gut microbiota to control Chagas disease vectors through systemic RNAi. *PLoS Negl Trop Dis* 9(2):e0003358.doi:10.1371/journal.pntd.0003358

\*Bustamante DM, SM De Urioste-Stone, JG Juárez, **PM Pennington** (2014) Ecological, social and biological risk factors for continued *Trypanosoma cruzi* transmission by *Triatoma dimidiata* in Guatemala. *PLoS ONE* DOI: 10.1371/journal.pone.0104599

\*Lol JC, ME Castellanos, KA Liebman, A Lenhart, **PM Pennington**, NR Padilla (2013) Molecular evidence for historical presence of knock-down resistance in *Anopheles albimanus*, a key malaria vector in Latin America. *Parasites & Vectors* 6:268

\*Monteiro FA, T Peretolchina, C Lazoski, K Harris, EM Dotson, F Abad-Franch, E Tamayo, **PM Pennington**, C Monroy, C Cordon-Rosales, PM Salazar-Schettino, A Gómez-Palacio, MJ Grijalva, CB

Beard, PL Marcet (2013) Phylogeographic pattern and extensive mitochondrial DNA divergence disclose a species complex within the Chagas disease vector *Triatoma dimidiata*. PLoS ONE 8(8): e70974. doi:10.1371/journal.pone.0070974

\*Zumaya-Estrada FA, LAMessenger, TLopez-Ordonez, MD Lewis, CA Flores-Lopez, AJ Martínez-Ibarra, **PM Pennington**, C Cordon-Rosales, HV Carrasco, M Segovia, MA Miles, MS Llewellyn (2012) North American import? Charting the origins of an enigmatic *Trypanosoma cruzi* domestic genotype. Parasites & Vectors 5:226 doi:10.1186/1756-3305-5-226

Taracena ML, LP Oliveria, PSG Oliveira, EM Dotson, **PM Pennington**. "System and use of bacteria producing doublestranded RNA for silencing of genes in triatomines" patent deposited at Instituto Nacional de Propiedad Industrial de Brazil, 02-05-2012. No. BR 1020120103036.

\***Pennington PM**, C Paiz, LM Grajeda, C Cerdón-Rosales (2009) Concurrent detection of *Trypanosoma cruzi* lineages I and II in domestic *Triatoma dimidiata* from Guatemala. Journal of Tropical Medicine and Hygiene.80: 239–241

Cerdón-Rosales, C, **P Pennington** (2007) Eco-epidemiología de la transmisión vectorial de la enfermedad de Chagas en Guatemala. Revista de la Universidad del Valle, Universidad del Valle de Guatemala. P 63-84.

**Pennington P**, CB Beard and J Anderson (2004) Care, maintenance and handling of infected triatomines. In, B.J. Beaty and W.C. Marquardt (eds.) Biology of disease vectors. 2<sup>nd</sup> ed. University Press of Colorado. p717-725

\*Beard CB, EM Dotson, **PM Pennington**, S Eichler, C Cordon-Rosales, RV Durvasula (2001). Bacterial symbiosis and paratransgenic control of vector-borne Chagas disease. International Journal of Parasitology 31:621-7.

\***Pennington PM**, D Cadavid, J Bunikis, SJ Norris, AG Barbour (1999) Extensive interplasmidic duplications change the virulence phenotype of the relapsing fever agent *Borrelia turicatae*. Molecular Microbiology 34:1120-1132.

\***Pennington PM**, D Cadavid, AG Barbour (1999). Characterization of VspB of *Borrelia turicatae*, a major outer membrane protein expressed in blood and tissues of mice. Infection and Immunity 67: 4637-45.

Cadavid D, **PM Pennington**, TA Kerentseva, S Bergstrom, AG Barbour (1997). Immunologic and genetic analyses of VmpA of a neurotropic strain of *Borrelia turicatae*. Infection and Immunity. 65:3352-3360.

\***Pennington PM**, CD Allred, CS West, R Alvarez, AG Barbour (1997). Arthritis severity and spirochete burden are determined by serotype in the *Borrelia turicatae*-mouse model of Lyme disease. Infection and Immunity. 65:285-292.

Stone, WH, DG Saphire, SM Hackleman, AM Braun, **P Pennington**, J Scheffler, JC Wigle, AB Cox (1994) Effect of radiation and age on immunoglobulin levels in Rhesus monkeys (*Macaca mulatta*). Radiation Research. 138: 401-408.

### **Distinctions and Scientific Projects**

2017- Principal investigator-RNAi for female elimination, CDC Foundation

2017- Principal co-investigator- "Expansion of a congenital Chagas disease screening program to include Zika"-CDC.

2016- Accepted into the Guatemalan Academy of Sciences

2015- Awarded a distinction in Research and Teaching at Universidad del Valle de Guatemala

2015- Principal investigator- Comparing Rearing Efficiency and Competitiveness of Sterile Male Strains Produced by Genetic, Transgenic or Symbiont-based Technologies. “Modifying mosquito gut microbiota to induce male sterility through RNA interference”. International Atomic Energy Agency.

2015- Principal co-investigator- “Prevalence of infections with *Trypanosoma cruzi* in a region of Guatemala with persistent infestation of triatomines, (Comapa, Jutiapa, year 2015)”

2015- News report on SciDev describing the results of the Chagas disease community-based research project. <http://www.scidev.net/america-latina/enfermedades/noticias/intervencion-de-la-comunidad-ayuda-a-prevenir-el-chagas.html>

2014 Recipient of the “Biomolecules in Guatemala Award”, awarded by the department of Biochemistry and Microbiology, Universidad del Valle.

2014- Scholarship to attend the 13<sup>th</sup> International Congress of Parasitology in Mexico City.

2012-Recipient of an ASM International Leaders in Education Fellowship, to attend the ASM Conference for Undergraduate Educators at Englewood, Colorado, May 16-19 2013.

2011-Recipient of an ENLACE fellowship to establish a collaboration with Dr. Michael Miles at the London School of Tropical Medicine and Hygiene.

2010-Principal investigator, Third World Academy of Science grant for the study “Evaluation of the antibody response in chickens to *Triatoma dimidiata* bites as a potential surveillance tool for infestation.”

2009-Principal investigator, WHO/TDR funds for study on “Management of peridomestic animals for the control of Chagas disease”, as part of the initiative “Towards improved Chagas and dengue disease control through innovative ecosystem management and community-directed interventions: an eco-bio-social research programme on Chagas and dengue disease control in Latin America.”

2007-Principal investigator, National Science Funds (Guatemala) for the study “Evaluation of a molecule as a target for a microbial insecticide against the vectors of Chagas disease”.

2007-Fellowship with the Canada-Latin America and the Caribbean Research Exchange Grants to work with Dr. Carl Lowenberger, Simon Fraser University, Burnaby, Canada.

2006-Researcher, National Science Funds (Guatemala) to study “Molecular typing of *Trypanosoma cruzi* to study its transmission cycles in Guatemala”.

2006-Wrote a proposal for the “Development of a National Biotechnology Program for Guatemala Phase I: Prioritization of Areas of Intervention”, funded by UNESCO. Led the first National Workshop to Identify Priority Areas in Biotechnology.

2005-PAHO Scholarship to attend the course “Epidemiology of Infectious Diseases” in Sao Paulo, Brasil.

2003-Awarded a World Health Organization (Special Programme for Research and Training in Tropical Diseases) grant for the study “Assessing the role of *T. dimidiata* and *R. prolixus* in the sympatric transmission of *Trypanosoma cruzi* in Guatemala”.

2001-Awarded a World Health Organization (Special Programme for Research and Training in Tropical Diseases) grant for the study “Genetic variability of *Trypanosoma cruzi* as a determinant of myocardial tropism”.

2001-Awarded a World Health Organization (Special Programme for Research and Training in Tropical Diseases) grant for the study “Molecular genetic analysis of *Triatoma dimidiata* dispersal patterns from domiciliated and potential sylvatic foci in Guatemala”.

2000-Awarded a Gorgas Memorial Institute Research Award for the study “Assessing the role of *T. dimidiata* and *R. prolixus* as vectors of Chagas disease in Central America”

2000-Awarded a CDC scholarship to continue work on Chagas disease.

2000-Appointed as the American Society for Microbiology Ambassador to Central America.

1999-Awarded a Howard Hughes Medical Institute scholarship to attend a course on the Biology of Disease Vectors in Manaus, Brazil.

1998-Awarded an NCID (National Centers for Infectious Disease) post-doctoral fellowship by the American Society for Microbiology.

1996-Recipient of the Florence Terry Griswold Scholarship. This is a scholarship given to a Latinamerican woman who is working on a graduate degree at a State University in Texas.

1992-Nominated for the Honor Society of Phi Kappa Phi at The University of Texas at Austin. This honor society honors those students of good character who have excelled in scholarship in any field.

1991-Awarded The University Scholarship at The University of Texas at Austin. This is a scholarship given to a few students with outstanding scholastic achievements.

## Abstracts

2015 –American Society for Tropical Medicine and Hygiene Congress, Philadelphia Pennsylvania, USA. Participatory development of a congenital Chagas disease screening strategy after the vector control attack phase in Guatemala.

2012- American Society for Tropical Medicine and Hygiene in Atlanta, GA, USA. Poster presentation “ Identification of molecular targets for a novel microbial insecticide for the control of Chagas disease.” Taracena ML, PL Oliveira, O Almdares, C Umaña, C Lowenberger, E Dotson, GO Paiva-Silva, and PM Pennington

2011-7<sup>th</sup> European Congress on Tropical Medicine and International Health, Barcelona, Spain  
“Neutral single nucleotide polymorphic markers to study the dynamics of *Plasmodium vivax* infections.”  
“Peridomestic animals as risk factors for *Triatoma dimidiata* infestation in an area endemic for Chagas disease in Southeast Guatemala.”

2011 - Gordon Research Conference on Tropical Infectious Diseases. From Bench to Field, Galveston, TX. USA. Poster presentation.

2009 - Gordon Research Conference on Tropical Disease Control, Galveston, TX. USA

Abstracts presented at the 2004 American Society for Microbiology meeting in New Orleans, LA, USA:

- Potential of the house fly, *Musca domestica*, as a vector of transgenic symbionts of *Rhodnius prolixus*, a Chagas disease vector
- Symbiotic potential of the bacterial flora of domestic triatomine vectors of Central America
- Identification of two major strains of *Trypanosoma cruzi* involved in distinct domestic transmission cycles in the North and South of Guatemala using newly developed microsatellite markers

2004- Pew meeting on Biotech Bugs.

“Insect specificity of transformed bacterial formulation for Chagas disease control.”

2000- American Society for Tropical Medicine and Hygiene in Houston, T.X.

“Bacterial symbionts and the control of Chagas disease”

1999- American Society for Tropical Medicine and Hygiene in Washington, D.C.

“Re-evaluating the risk of *Trypanosoma cruzi* transmission by *Triatoma dimidiata* and *Rhodnius prolixus*”

1995- Arthritis Foundation Meeting in Chicago, Illinois.

"A surface protein of *Borrelia turicatae* is associated with severe arthritis in a SCID mouse model of Lyme disease" at the

### **Invited Lectures and Technical Assistance**

2017- Invited speaker, Entomology Society of America, Pacific Branch, Molecular Symposium, Portland, Oregon, April 2-5.

2017- Invited speaker at the 2<sup>nd</sup> meeting of working group on Comparing Rearing Efficiency and Competitiveness of Sterile Male Strains Produced by Genetic, Transgenic or Symbiont-based Technologies. “Modifying mosquito gut microbiota to induce male sterility through RNA interference”. International Atomic Energy Agency, Panama, Panama, March 26-31, 2017.

2017- Invited speaker, “Paratransgenesis: the unlikely road from lab to field” at Gordon Research Conference on Tropical Diseases, Galveston, Texas, USA, March 13-17, 2017.

2016- Symposium organizer “Peridomestic Animals and Chagas Vector Control”, International Entomology Congress, Orlando, Florida, USA

2016- Invited to participate in the World Organization of Intellectual Property Workshop on added value services to support innovation based on technological surveillance and competitive intelligence, Bogotá, Colombia.

2016- Technical expert at the Meeting on Aedes Mosquito Population Control Using an Integrated Vector Management Approach with SIT Component, Brazilia, Brazil 24-26 February 2016.

2015- Lecturer “Applying paratransgenic approaches to control disease” Keystone Symposium The Arthropod Vector: The Controller of Transmission, Taos, New Mexico, USA

2014- Lecturer “Applying paratransgenesis for disease control” NIAID Workshop: Arthropod Vectors and Disease Transmission: Translational Aspects Rockville, MD, May 14 2014

2013- Lecturer “Paratransgenic insects for the control of Chagas disease” at the First Biotechnology Congress of Central America, Panama and Dominican Republic, San Salvador, El Salvador.

2013-Founder of the Guatemalan National Bioinformatics Network and organizer of a workshop series to promote Bioinformatics in Guatemala.

2012-Organizer of the symposium Round Table 1: Vector-Borne and Zoonotic Diseases in Guatemala at the Netropica meeting, Copán, Honduras.

2010-Speaker at the American Society for Tropical Medicine Symposium: Host-microbe interactions influence pathogen transmission and can be harnessed for disease control. “Development of a transgenic microbial insecticide for the control of Chagas disease”

2010-Invited professor for Arthromint meeting, Ilha Grande do Sul, Brasil.

2010-Invited to participate in a workshop on *T. cruzi* typing organized by ChagsEpiNet, Fiocruz, Rio de Janeiro, Brasil.

2009-Invited lecturer "Development of a transgenic microbial insecticide for the control of Chagas disease", Universidad Federal do Rio de Janeiro, Brasil.

2006-Invited lecturer "Principles of Biosafety: The case of Avian Influenza" at the International Workshop on Strengthening Laboratory and Biosafety in Meso and Central Americas, Guatemala, Guatemala.

2006-Technical assistant for the laboratory component of the "Workshop for the Preparation of the National Plan for Epidemiological Surveillance towards Avian Flu Preparedness", Antigua Guatemala, Guatemala

2006-Invited lecturer "Avian Influenza Diagnostics" at the "Workshop on Avian Influenza Preparedness" led by the Ministry of Agriculture of Guatemala, Retalhuleu, Guatemala.

2006- Scientific reviewer for the National Council for Science and Technology.

2005-Invited lecturer "May contain GMO: technical limitations to the regulation of modern biotechnology" at the Forum "New Genetics, Social Dilemmas" and at the National Scientific Week, Guatemala, Guatemala

2005-Technical assistant on laboratory surveillance systems and quality control for the Honduran Health Secretariat as part of a USAID project to improve the Honduran health surveillance system.

2006-Invited lecturer "Transgenic vectors, an alternative for the control of Chagas Disease", at the "Congress on alternatives for the improvement of housing for the control of Chagas disease in Casanare", Yopal, Colombia.

2006-Invited lecturer "Biotechnology in the control of Tuberculosis" for the Central American Congress of Internal Medicine, Antigua Guatemala, Guatemala.

2005-Invited lecturer "Transgenic bugs in disease control" for the National Scientific Week, Guatemala, Guatemala.

2003-Invited lecturer "Environmental risk evaluation for the release of recombinant symbionts" as part of the fórum "Paratransgenic vectors: development of a new strategy for the control of Chagas disease in Guatemala" at the Central American Parasitology Congress, Guatemala, Guatemala.

2003-Invited lecturer "Genetic markers for *T. cruzi* strain identification" at a workshop on the application of remote sensing for tropical disease research, Guatemala, Guatemala.

2000-Invited lecturer "Bacterial symbionts and the control of Chagas disease" at the International Congress of Entomology at Iguassu Falls, Brazil

1998-Invited lecturer "Switching of Vsp genes and disease phenotype by extensive DNA rearrangements in *Borrelia turicatae*" at the Gordon Conference on Spirochetes in Ventura, California

1996-Invited lecturer "The *Borrelia turicatae* mouse model of Lyme disease: disease severity is determined by serotype" at the Pathogenesis of Lyme Disease Symposium during the VII International Congress on Lyme Borreliosis in San Francisco, California.

1996-Invited lecturer "*Borrelia turicatae* in the mouse: a model to study brain invasion by spirochetes" during a visit at the Pasteur Institute in Lille, France.

1995-Invited lecturer "*Borrelia turicatae* in the mouse: a model to study host-spirochete interactions" at a symposium on the Role of the Laboratory in Understanding the Natural History of Disease, during the 45th annual Southwest Conference on Diseases in Nature Transmissible to Man in San Antonio, Texas.

### **Supervised Theses.**

2016- Pamela Flores, Natalia Flores, Mayra Valey, Augusto Franco. Biochemistry and Microbiology Undergraduate degree. "Use of transgenic bacteria for the control of vector-borne diseases."

2016- Daniella Moller, Biology undergraduate degree UVG. "Dinámica de alimentación de *Triatoma dimidiata*, vector de la enfermedad de Chagas, en una región de Guatemala con infestación persistente (Comapa, Jutiapa).

2016- Gabriella Moller, Biology undergraduate degree UVG Desarrollo de un ensayo de Inmunofluorescencia Indirecta (IFA) local para el diagnóstico de la Enfermedad de Chagas

2014- Margarita Rivera, Anthropology B.S. Universidad del Valle de Guatemala (UVG), "Women and change: an evaluation of the change in practices in the project Chagas WHO-UVG in Comapa, Jutiapa".

2014- Guillermo Augusto Cruz Zetina, M.Sc. Biomédicas, Universidad Autónoma de Campeche, México. Cloning of salivary gland transcripts of *Triatoma dimidiata* from Yucatán, México and Guatemala and sequence analysis of three lipocalin cDNAs.

2013- Jeffrey Roberto Reina, Biology undergraduate degree UVG, Evaluation of the phylogenetic relationship between *Trypanosoma cruzi* Chagas, 1909 (Kinetoplastida: Trypanosomatidae) and *Triatoma dimidiata* Latreille, 1811 (Hemiptera: Reduviidae) in domestic environments in Guatemala.

2012- Paulo Juárez, Biochemistry and Microbiology undergraduate degree UVG. "Secondary humoral response of hens immunized with saliva from *Triatoma dimidiata* (southern Chiapas, México) and their cross-reaction with other triatomines"

2012- Nancy Cruz, M.Sc. England.

2012- Hugo Perdomo, Biochemistry and Microbiology undergraduate degree UVG, Characterization of the motility of nymphs and the Rhodnius Heme Binding Protein (RHBP) in the hemolymph of de *Rhodnius prolixus* Stahl 1859, females fed bacteria producing dsRNA for RHBP.

2012- Ana Paola Cáceres, Biochemistry and Microbiology undergraduate degree UVG, Determination of rodent blood meal patterns in the vector el vector *Triatoma dimidiata*, collected during the months of January-August 2011 in Comapa, Jutiapa, Guatemala

2012 Mabel LalineTaracena, M.Sc. Universidad Federal de Río de Janeiro, Brazil. Silenciamiento génico de *Rhodnius prolixus* por ingesta de bacterias productoras de ARNdh.

2010- José Guillermo Juárez, Biology undergraduate degree UVG, Evaluation of methods to induce RNAi with dsRNA for Rhodnius Heme-Binding Protein (RHBP) in nymphs of *Rhodnius prolixus* Stahl 1859, vector of Chagas disease.

2010 Francisco Valencia, Biochemistry and Microbiology undergraduate degree UVG, Analysis of presumptive *Bacillus thuringiensis* strains isolated from the avocado tree phyllosphere using oligos to amplify *cry* genes.



2008 Dinora Roche, Biochemistry and Microbiology undergraduate degree UVG, Characterization of the biodiversity of presumptive *Bacillus thuringiensis* strains in different niches of the phyllosphere of the avocado tree in Guatemala, Sacatepéquez and Alta Verapaz, 2008.

2008- Claudia Paiz, Biochemistry and Microbiology undergraduate degree UVG, Genetic characterization of the *Trypanosoma cruzi* lineages found in feces of *Triatoma dimidiata* and *Rhodnius prolixus* using the mini exon.

2006- Laura Grajeda, Biochemistry and Microbiology undergraduate degree UVG, Study of the transmission cycle of *Trypanosoma cruzi* between *Rhodnius prolixus* and *Triatoma dimidiata* through the genetic typing of the parasite.

2004 Mary Alejandra Krische, Biochemistry undergraduate degree UVG, Development of a cost-effective technique for the identification and automated characterization of microsatellites applied to *Triatoma dimidiata*.

2003- Roberto Estuardo Archila, Biochemistry undergraduate degree UVG, Isolation and characterization of possible symbiotic bacteria from *R. prolixus* collected in the field in Guatemala.

2003- Paola Rivera, Biochemistry undergraduate degree UVG, Identification and characterization of polymorphic microsatellites in *Trypanosoma cruzi*.

2002 Lizeth Alejandra Castillo, Biochemistry undergraduate degree UVG, Genic variability of *Trypanosoma cruzi* isolated from tiratomines in five endemic areas of Guatemala.

#### **Peer Reviewer**

2017-Reviewer for PLOS NTDS

2016-Reviewer for Vector Biology Journal, PLOS NTDS, BMC Medical Education

2015-Reviewer for BMC Medical Education, Journal of Medical Entomology, Parasites and Vectors, Nature Scientific Reports, PLOS NTDS

2015-Grant reviewer for the World Health Organization (TDR) and National Health Institutes of France .

2013-Reviewer for PLOS NTDS

2008, 2009-Reviewer for American Journal of Tropical Medicine and Hygiene

2007-Reviewer for Emerging Infectious Diseases, American Journal for Tropical Medicine and Hygiene.

2006-Scientific reviewer for the National Science and Technology Council of Guatemala