Juan Carlos Rueda Silva

B.S. Biotechnology Engineering Student, 9th semester

Contact

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Education

Instituto Tecnologico y de Estudios Superiores de Monterrey – Campus Estado de Mexico (ITESM-CEM)
B.S. in Biotechnology Engineering
Bioprocess Engineering Specialization
Accumulated grade: 98.7/100
GPA: 4.0
Top 1% percentile

Languages

English: Advanced (IELTS 8.0)
German: Goethe-Zertifikat B2, coursing C2.3 at Goethe-Institut Mexiko.
French: Coursing B2.4 at Alliance Francaise Mexique.
Spanish: native.

Laboratory skills

- Multiple molecular biology techniques
- Microbiology and Genetic Engineering techniques
- Restriction cloning
- TOPO cloning

Objective

Looking for research opportunities with the objective of apply my previous knowledge, gain new knowledge and abilities. With the goal of contributing to human knowledge.

Experience

March 2017- Present

Silencing Diaphorina citri Genes Using RNAi for Control of Huanglongbing Disease • ITESM-CEM/CINVESTAV

This project titled “Silencing multiple *Diaphorina citri* genes using siRNA for control of Huanglongbing disease in citrus plantations” was presented during iGEM 2017 (more info: https://2017.igem.org/Team:TecCEM), it consisted on evaluating feasibility of using siRNA mediated RNAi as a control method for *D.citri* plague. For this goal, a siRNA expression method through synthetic biology, siRNA nanoencapsulation, *D.citri* siRNA application assays were developed and RT-qPCR was used for result analysis. I was the designer and developer of the subprojects:

- BSLA: a novel siRNA expression vector for *E. coli* HT115.
- An economic and easy-to-use bioreactor.
- BioBrick assembly assistant software.

I was involved with i*n silico* target genes and sequence selection. Designed the siRNAs used for the silencing, did the *in silico* design of the BSLA expression system and developed it experimentally. Genetic engineering experimentation. Participated in the design and implementation of the methodologies for the assays on *D. citri*. Did the interpretation and analysis of RT-qPCR data. Writing of the paper and figure construction, results analysis and discussion. Literature review.

March 2020 - Present

Detecgnosis • Founder and team leader

Detecgnosis is a molecular diagnosis start-up looking for commercializing a new chemical entity designed by me that has applications for molecular diagnosis by detecting specific RNA sequences and with results readable by a change in color. (https://www.f6s.com/detecgnosis, www.detecgnosis.tk)

October 2020

Grant Proposal Writing • Bayer Crop Science • Fighting pests while preserving biodiversity

Project: Chitosan nanoparticles as a controlled delivery method of siRNA treatment for *D. citri* control in agriculture. PI: Ana Laura Torres Huerta, PhD.

- Transformation (chemical and electroporation)
- Nucleic acid extraction
- Characterization protocols,
- Microscopy,
- Electrophoresis (TBE and TAE agarose electrophoresis, PAGE)
- Spectrophotometry techniques
- Western blot
- Chitosan nanoencapsulation
- Nucleic acid purification
- Recombinant protein purification
- Cell culture manipulation
- PCR
- RT-qPCR
- Protein quantification with Bradford and Lowry methods
- Microbiological staining
- Sterile technique

Software

- Multiple Bioinformatics Online Tools
- Snapgene
- Python programming (including GUI development and basic genetic algorithm)
- MATLAB
- Mathematica
- AutoCAD
- Minitab
- Office suite
- Basic Website Development
- Video Editing Software
- Adobe Suite

Interests

- Synthetic Biology
- Bioinformatics
- Functional Nucleic Acids
- Directed evolution
- Epigenetics and developmental biology
- Biomolecule engineering

January 2019 - Present

Novel de novo DNA synthesis method using TdT polymerase • ITESM-CEM/CINVESTAV

This project, which was my own initiative, consists on the development of a *de novo* DNA synthesis method using template-independent TdT polymerase. The project has two main goals, the development of a recombinant expression system for the polymerase and the development of a microfluidic system that allows the controlled addition of specific nucleotides for the synthesis of custom oligonucleotides.
I am in charge of the theoretical development of the project, *in silico* design, genetic engineering experiments, bioinformatic design, experimental development and hardware development and team organization.

January 2019 - Present

Lactic Acid production through fermentation of pelagic *Sargassum* • ITESM-CEM/CINVESTAV

This project consists on the development of an alternative method for the production of lactic acid through the fermentation of *Sargassum*, with the aim of helping with the environmental problem that represents the excessive proliferation of this algae.
I am in charge of the design and development of downstream processing and the writing of the paper.

March 2018 – October 2018

Novel Treatment: Tissue regeneration in burns by recombinant proteins with nanodelivering on a MiniSkin Simulator • ITESM-CEM/CINVESTAV

This project titled “Novel Treatment: Tissue regeneration in burns by recombinant proteins with nanodelivering on a MiniSkin Simulator” was presented during iGEM 2018 (International Genetically Engineered Machine), it consisted on the development of a novel formulation using recombinantly-expressed scaffolding and growth factors, which ere nano-encapsulated and tested for its efficiency in second-degree burns in an organ-in-a-chip system.
I was in charge of the theoretical development of the project, *in silico* analysis, genetic engineering experiments and experimental development.
More info: https://2018.igem.org/Team:TecCEM

March 2016 – October 2016

Rapid test for HPV diagnosis via riboswitch technology • ITESM-CEM/CINVESTAV

This project titled “Rapid test for HPV diagnosis via riboswitch technology” was presented during iGEM 2016, it consisted on the development of a novel HPV diagnosis method using riboregulators and their interactions with viral mRNA, with the aim of developing a cost-effective in consolatory HPV molecular diagnosis method. For this goal I also developed the following subprojects:

- A riboregulator design assistant software.
- A portable electroporation device.

I was in charge of the theoretical development of the project, *in silico* analysis, genetic engineering experiments and experimental development.
More info: https://2016.igem.org/Team:TecCEM_HS

December 2014 – September 2015

Bioremediation of Lago de Guadalupe • ITESM-CEM/CINVESTAV

This project titled “Bioremediation of Lago de Guadalupe” was presented during iGEM 2015, it consisted on the development of a biofilter for the prevention of SDS-based detergent pollution in water bodies, this was done through the recombinant expression of the enzymes alkyl sulfatase and ferritin for the degradation of SDS. For this goal I also developed the following subprojects:

- Development of necessary hardware for the biofilter.
- An empirical-data based pollutant distribution estimation software.

I was in charge of the theoretical development of the project, *in silico* analysis, genetic engineering experiments and experimental development.
Also, during the development of this project I participated in the iGEM InterLab study, which resulted in the paper "Reproducibility of Fluorescent Expression from Engineered Biological Constructs in *E. coli*" (Doi: 10.1371/journal.pone.0150182)
More info: https://2015.igem.org/Team:TecCEM_HS

Soft skills

- Leadership
- Teamwork
- Responsibility
- Perseverance
- Flexibility
- Creativity
- Decision making
- Ability to learn

Publications and conferences

- Rueda-Silva J.C. *et al.* (2020). Silencing *Diaphorina citri* Genes Using RNAi for Control of Huanglongbing Disease. (submitted for peer-review to *Biotechnology & Bioengineering*).
- Rueda-Slva J.C. *et al.* (2020). Chitosan nanoencapsulation of siRNAs and its delivery through feeding to *Diaphorina citri* for control of Huanglongbing disease. (Manuscript in progress).
- Speaker at IGEM Foundation's Dry Lab Impulse – Webinar Series: BioBrick Builder (August 2020). (https://2020.igem.org/Teams/Mentorship/Dry_Lab_Impulse)
- BioTalks: "Biology+Engineering: Synthetic Biology" during the conference cycle "BioTalks" (October 2019)

Leadership

- Vicepresident and cofounder: Make It Green: Ecology focused student association. (August 2018 – May 2019)
- Treasure and directive board member: Nura: Social assistance student association (August 2016 – May 2017).

Awards

- One of Allbiotech's 100 Young Biotechnology Leaders for Latin America for 2021.

Allbiotech is an international NGO looking for promoting the development of the biotechnology environment in Latin America. Each two years they select 100 biotechnology professionals from the region with outstanding trajectories. One third of these nominations go to postdoctoral reasearchers, one third for entrepeneurs and industry professionals and one trhird for students and early-career researchers. These leaders participate in a leadership program and are invited to participate in Allbiotech's summit to discuss the challenges for the biotechnology environment in the region.

- Integral Student Award (ITESM-CEM School of Engineering and Sciences 2020).

The Integral Student Award is the most prestigious award given to undergraduates; this award is given during the last year their degree to one student per school per year. This is awarded based on the trajectory of the student during their undergraduate program and is awarded based on the following criteria: academic trajectory, leadership, entrepreneurship, social service, internationalization and cocurricular profile.

- Academic Excellence award (fall 2016, spring 2017, fall 2017, spring 2018, fall 2018, spring 2019, fall 2019, spring 2020).

The academic excellence award is awarded each semester by the university to undergraduates that have achieved grades over 95/100 the previous semester and are among the Top 5% highest grades among the entire student population.

- Nomination for best hardware, software, therapeutics and measurement special IGEM awards (IGEM 2018).

The IGEM foundation is an international NGO based in Cambridge, USA looking for the internationalization of synthetic biology, each year they organize the IGEM competition, which calls High School, Undergrad and Overgraduate students to present projects that solve some problem using synthetic biology. For each category, some special awards are given for outstanding projects.

- Outstanding trajectory in IGEM Teams (IGEM TecCEM 2018).

Special award (has only been given once) given by IGEM TecCEM instructors for students that have outstanding trajectories and have done outstanding trajectory throughout multiple IGEM teams.

- IGEM Gold medal (IGEM 2018, IGEM 2017, IGEM 2015), IGEM Bronze medal (IGEM 2016).

The IGEM foundation is an international NGO based in Cambridge, USA looking for the internationalization of synthetic biology, each year they organize the IGEM competition, which calls High School, Undergrad and Overgraduate students to present projects that solve some problem using synthetic biology. The gold and bronze medals are given to teams based on the achievement of project objectives.

- Best Team Member (IGEM TecCEM 2017, IGEM TecCEM_HS 2016, IGEM TecCEM_HS 2015).

Award given by IGEM TecCEM instructors to one student each year, who has an outstanding participation and contributed greatly to the achievement of the project objectives.

- Academic Talent Scholarship 80% (2016).

Scholarship given to the students that achieved the highest scores nationally on a standardized test. They award are assigned based on the score obtained and the scholarship percentages available are 80%, 60% and 40% that is reduced from the tuition fees for the entire undergraduate program at ITESM.

Courses

- Biotechnology & Genetics. Oxford Summer Courses at the University of Cambridge (July-August 2019).
- MIT's nanoLab (online, June 2020).
- Drug Development Product Management Specialization. UC San Diego. (Online through Coursera; https://www.coursera.org/account/accomplishments/specialization/certificate/YTELLDTYVQMY)
- Epidemiology for Public Health Specialization. Imperial College London. (Online through Coursera; https://www.coursera.org/account/accomplishments/certificate/T4WZFYCNSRNF).
- Applied Data Science with Python Specialization. University of Michigan. (Online through Coursera; https://www.coursera.org/account/accomplishments/specialization/certificate/AVRHKHTTGNHS).
- Genomic Data Science Specialization. Johns Hopkins University. (Online through Coursera; https://www.coursera.org/account/accomplishments/specialization/certificate/8XAJ5TYCFY6W).

- Fundamentals of Immunology Specialization. Rice University. (Online through Coursera; https://www.coursera.org/account/accomplishments/specialization/certificate/VRP9FLSMJFGC).
- Entrepreneurship: from the idea to the enterprise. National Autonomous University of Mexico-Santander (online, June 2020).
- Key skills and abilities for the professional world. ANUES FESE (online, June 2020).
- Biological sample conditioning and electrophoresis. National Autonomous University of Mexico, Medicine Faculty (June-July 2018).
- Tissue culture. LANSE. (July 2018).

Course Related Projects

- Spring 2020: Senchin: production of an alimentary supplement based on CTGs nanoencapsulated with gelatin, with tested antibacterial and antifungical properties
- Spring 2019: Theoretical development of a quick melanoma diagnosis method using functional nucleic acids.
- Fall 2018: Theoretical development of a toeholdswicth based HPV diagnosis method implemented within a Lab-On-A-Disk system.
- Spring 2018: Development of a thermodynamic cyle simulator on python with GUI.
- Spring 2018: Microbiological sampling of “Presa del Llano”.
- Spring 2017: Development of a restriction cloning simulator using Python.

Cocurricular profile

- Literary Circle (Fall 2016, Spring 2017, Fall 2017, Spring 2018, Fall 2018, Spring 2019, Fall 2019).
- Painting class (Fall 2017, Spring 2018, Spring 2019, Fall 2020).
- Artistic Drawing class (Fall 2016, Spring 2017)
- Creative Writing workshop (Spring 2020, Fall 2020).

Public Engagement Activities

- Gave a lecture on synthetic biology perspectives and genetic engineering to high school students at PrepaTec CEM taking the academic course “Introduction to Biotechnology” (August 2019).
- Designed and implemented a workshop about introductory cell, synthetic and molecular biology at Rino-Q foundation for burnt children (July 2018) (More information: http://2018.igem.org/Team:TecCEM/Public_Engagement).
- Designed and implemented a workshop for children about synthetic, cell and molecule biology at Universum science museum (July 2018) (More information: http://2018.igem.org/Team:TecCEM/Public_Engagement).
- Designed and implemented a workshop for elementary school students about the central dogma, microbiology and synthetic biology at Escuela Infantil Xipal, Colegio Mundo Montessori and Colegio Montessori Helen Keller (June 2017) (More information: http://2017.igem.org/Team:TecCEM/Engagement).
- Designed and implemented a workshop about introductory biology for kindergarten students at Escuela Infantil Xilpal (July 2016) (More information: http://2016.igem.org/Team:TecCEM_HS/Engagement).

- Designed and implemented workshop about introductory molecular biology, virology and immunology for elementary school children at Escuela Infantil Xipal and Colegio Montessori Helen Keller (June-July 2016) (More information: http://2016.igem.org/Team:TecCEM_HS/Engagement).
- Gave a lecture on virology for middle school students at Centro Academico Xipal (July 2016) (More information: http://2016.igem.org/Team:TecCEM_HS/Engagement).
- Designed and implemented the workshop “General Genetics for Kindergartens” at Kinder Lomas Verdes (June 2015) (More information: http://2015.igem.org/Team:TecCEM_HS/Practices)
- Designed and implemented the workshop “Genetics and Synthetic Biology Principles for elementary schools” at Colegio Montessori Helen Keller (July 2015) (More information: http://2015.igem.org/Team:TecCEM_HS/Practices).
- Designed and implemented the workshop “Synthetic Biology and Genetics” at the elementary school Escuela Infantil Xipal and middle school Centro Academico Xipal (June-July 2015) (More information: http://2015.igem.org/Team:TecCEM_HS/Practices).

References

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