

# Dr. Eng. Daniel Grajales García

## *Curriculum Vitae*

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### DOCTORAL RESEARCH

#### “Lab-on-a-chip Integration of the Bimodal Waveguide Nanointerferometric Biosensor”

My research examined the integration of a nanophotonic bimodal interferometric biosensor into a Lab-on-a-Chip platform of multiple subsystems to perform bioanalytical assays. It included the design optimization, simulation, fabrication and characterization of Nanophotonic Devices developed using Integrated Optics and standard CMOS fabrication methods. Also, the optimization of current fabrication tolerances as well as microfluidics, mechanical positioning, temperature, electronic hardware control and acquisition, information processing, storing and displaying systems. It included the development of an optical chirp modulation system to enhance the readout limits. A 1x2, 1x4 and 1x8 multiplexed version of the biosensor chip was proposed, fabricated and characterized obtaining positive results through the implementation of a software-based read-out solution. All the work was done in close collaboration with CMOS photonic foundries employing Silicon-Based technologies (RIE, LPCVD, PCVD, photolithography, etc), with teams of biotechnologists in collaboration with health research centres like Vall d’Hebron Hospital, and equipment for characterization like TEM, SEM, XPS, Perfilometers, etc.

### RESEARCH INTERESTS

Biosensing, Nanotechnology, Waves and Interference, Sustainable Development and Alternative Energies, Radio-Localization, Networks and Telecommunications, Wireless Technologies, Bioinformatics, Functional Neural Networks, Complex Systems, Consciousness, Education and Innovation.

### KEY ACHIEVEMENTS

- 2017 *Tapers for light in-coupling*  
Design, simulation, fabrication and characterization of an inverted and vertical taper for photonic end-fire coupling
- 2017 *Chirp Modulation System for BiMW*  
Design, simulation and implementation of a chirp modulation system for BiMW nanointerferometric biosensors
- 2017 *Detection of of MRSA E. Coli*  
Integration of Photonic Biosensor
- 2016 *Acquisition of Edenrock Comm LLC*  
By Nokia Networks Solutions
- 2014 *DiyBio Barcelona*  
Founder of the DiyBIO BCN community lab
- 2014 *Interference Detection Software*  
System for interference detection based in 4G networks
- 2013 *SON Management Software*

### EDUCATION

2014 – 2018 **PhD in Electronics and Telecom Eng.**  
EXCELLENCE PROEFFICIENCY. BCN, SPAIN  
Nanobiosensors Bioanalytical Apps  
*Autonomous University of Barcelona*

2010 – 2012 **M. Sc. Nano and Bio Photonics**  
MAGNA CUM LAUDE (95/100) PARIS, FRANCE  
Nano and Biophotonics for Tel and Bio  
*Ecole Normale Supérieure de Cachan*

2011 **Exchange semester**  
MADRID, SPAIN  
*Universidad Complutense de Madrid*

2011 **Exchange semester**  
WROCLAW, POLAND  
*Wroclaw University of Technology*

2012 **Exchange semester**  
BARCELONA, SPAIN  
*Cat. Inst. of Nanoscience and Nanotech*

2001 – 2006 **B.Sc. Electronics and Telecom Eng.**  
HONOURS: 91/100 MONTERREY, MEXICO.  
School of Electrical and Electronics Eng.  
*Monterrey Tech (ITESM)*

2005 **Exchange semester**  
ESSLINGEN, GERMANY  
*Hochschule Esslingen*

1999 – 2001 **High School**  
PHYSICS AND MATHEMATICS. GPA: 88/100  
Tuxtla Gutierrez, Chiapas  
*Chiapas State High School #2*

1995 – 1998 **Secondary School**  
BEST GPA OF CLASS: 98/100  
Joaquin Miguel Gutierrez  
*Federal School #5, Tuxtla, Chiapas.*

### AWARDS AND SCHOLARSHIPS

2020 **SNI-C**  
*Candidate to Member of the National Researchers System of Mexico (No. I1200/323/2019)*

2019 **Postdoctoral Position - Canceled by CONACYT**  
*Project for CMOS modulator fabrication  
CONACYT application 2019-000006-01NACV-01190  
ITESM and MIT, funded by SEP and CONACYT*

2019 **Postdoctoral Position - Declined**  
*Graphene and Nanomaterials Research Center  
MackGraphe Mackenzie Presbyterian University, Brasil*

- AI based software for network management
- Self Organizing Networks
- 2010 *Software for Multiplex Detection*
- CCD software for MZI biosensors multiplexing of 5nM of DNA related to lung cancer
- 2010 *Deployment of Wimax Lab* for OEM certifications
- 2009 *Deployment of Wimax Network* in Cameroon
- 2007 *Deployment of Symmetry One System*
- Ticket lowering and network optimization
- 2006 *WiFi Assisted Geolocalization Software*
- Linux based localization algorithms in Matlab
- 2005 *Homemade Antenna*
- Plot of the radiation pattern

## WORK EXPERIENCE

AUG 2019 - JUN 2020 (FT)

American School Foundation of Chiapas A.C.

### **STEAM teacher**

I am an International Baccalaureate (IB) and UNAM High School STEAM teacher of Cybernetics and Innovation Lab from 9th to 12th grade (20 hours a week). I provided advise to the Tech Support Department. I implemented the electronic waste recycling program in the school since November 2019. I helped to establish a collaboration between the Adopt-a-talent Program (PAUTA from UNAM) and the Institute. I was part of the team deploying a new methodology named GNIUS and finally, I am the head of a team redesigning the STEAM curricula for all grades.

AUG 2018 – JULY 2019. (FT)

American School Foundation of Chiapas A.C.

### **STEAM teacher and Head of Technical Support Department**

(IB) and UNAM High School STEAM teacher of Robotics and Research Methodologies (22 hours of classes per week). I re-designed the STEM program and helped setting up a STEM LAB facility. I simultaneously implemented MAPS testing (a standardized test system from USA), lightsailed reading and Discovery Education® for the whole institution (K12). I was in charge of the year planning (financial and work load) of the IT department which provided support to the whole Institution. Tuxtla Gutiérrez, Chiapas, México.

MAR – MAY 2018 (FT)

Chiapas Civil Engineers College AC

### **Systems Director**

Responsible of WiFi services, webpages, members Databases systems, audio and video systems, social networking, communications via massive mailing lists, etc. During my first two weeks, I improved the WiFi service installing an Unifi system, a webpage and audio and video systems. Tuxtla Gutiérrez, Chiapas, México

AUG 2015 – FEB 2016 (PT)

Nokia Networks Solutions

### **Associate Consultant**

I provided on-site support to legacy radio systems in Telefonica. They were SPARC and SOLARIS servers with a legacy Oracle 8 DB and java-based software. Barcelona, Spain

FEB 2014 – JUL 2015 (PT)

### 2019 **Bumblebee Project**

*My students were awarded the first prize of our internal Science Faire*

### 2018 **AllBiotech Leader**

*One of the 100 leaders of biotechnology in Latin America 2018 for the 2nd #AllBiotech*

### 2017 **Best Poster Award by OCLARO**

*European Conference on Integrated Optics*

### 2014 **PhD in a Foreign Country Scholarship**

*Mexican Council of Science and Technology*

### 2013 **Top Achiever Award – Systems Engineer**

*EdenRock Communications LLC., Bothell, WA*

### 2011 **Complementary Scholarship**

*Mexican Agency of Education*

### 2010 **Erasmus Mundus Master Scholarship**

*European Union*

### 2006 **High Performance Engineer Diploma**

*Mexican Evaluation Centre*

### 2001 **Academic Scholarship**

*Monterrey Tech (ITESM)*

### 1995 **Exchange to Oaxaca**

*Turism Secreary of Chiapas*

## SKILLS

### *Personal*

Open and curious, persistent, self-motivated, self-confident, energetic and creative with **entrepreneur personality**. Ability to work in multidisciplinary environments (Physics, Chemistry, Biotechnology and Engineering). Fluent in English (**TOEFL 600**) with conversational proficiency in French and German. Native Spanish speaker.

### *Technical*

Strong background in optical biosensors with special focus in design, fabrication and characterization of integrated optics devices. The laboratory work during my PhD included the design, simulation, characterization and test of silicon photonic waveguides for biosensing. I acquired the ability to work with chemical and biological protocols. I have strong programming and networking abilities as systems engineer (more than 5 years of experience as technical support engineer with Internet Service Providers around the world).

### *Academic*

I was educated using Montessori methodologies at home (reading, writing and basic mathematics at 4 y.o.). During the Elementary School, I was part of the *Development of Thinking Competences* program (Dra. Margarita de Sanchez) as student in the course *Learn to Think*. I was formed under Problem Based Learning (PBL) Methodologies during my University. I provided On-line support to students located in marginal regions in Nuevo Leon through PrepaNET program from Monterrey Tech (2006). I provided Academic support in physics, mathematics, and electric circuits to students at Monterrey Tech as social service (2005). I was a teacher of Physics III laboratory during my last year

Edenrock Communications LLC.

### ***Associate Consultant***

I was providing technical support to Telefónica Spain. I also helped with technical documents translations and support with events in Spain. Barcelona, Spain (2014 – February 2016). We participated with a booth stand with demos and meetings at the Xth and XIth Mobile World Congress. Barcelona, Spain (*March 2015 and February 2014*). Installation of a trial setup for Self-Organizing Networks System for Orange Telecomm. Tunis, Tunisia. (*February 2014*). SC-SON training course for regulatory government agencies in Mexico (IFETEL). México City. *August 2014*. Translation of patents and technical documentation for the Mexican Telecomm Industry: Interference related. (*Barcelona, Spain. 2014.*)

JAN 2013 – JAN 2014 (FT)

Edenrock Communications LLC.

### ***Systems Engineer***

Design and programming of a Monte-Carlo based 4G, 3G and 2G network system simulator for interference detection in C++ as researcher and developer. Inter-system (various technologies) interference studies made using the simulator. I was part of the Cross-Border Spectrum Co-existence SON system (SC-SON) development team. The project was sold to The United States and Mexican Governments. Seattle, Washington.

OCT 2013 – TO DATE (PT)

Procosur SA de CV

### ***Technical Advisor and Investor***

I have helped with the design, planning and implementation of an ecovillage named “pepenetik (butterfly in Mayan) in Juan de Grijalva, Chiapas. We produced our own energy locally and tried to provide all local-fresh-food supplies. I worked on the re-design of the construction company towards a greener local business enhancing its participation in eco projects in the south of Mexico. It is a Family Business. Implementatino of websites of local Institutions. Tuxtla Gutierrez, Chiapas

NOV 2009 – JUL 2010 (FT)

Edenrock Communications Co.

### ***Systems Engineer***

I was part of the team that tested and certified different WiMAX vendors for an ISP called AXTEL. We also debugged Motorola equipment already deployed on Axtel’s production network. To do so, we set up a laboratory for testing, debugging and certification. We designed and performed many of the tests applied to vendors. I was helping the local ISP to get a better vision of its WiMAX providers. Ramos Arizpe, Coahuila, Mexico.

SEP 2006 – FEB 2010 (FT)

SR Telecom

### ***Customer Support Engineer***

I worked as Technical Customer Support Engineer of a company that designed, fabricated and sold radio access equipment for fixed telephony and data (pre-WiMAX proprietary technology) to ISPs like Telefónica Spain, AXTEL México, TELMEX Argentina, CTR Chile, Mediatrix Cameroon. I did the maintenance and administration of Unix servers, system administration of Oracle Databases and provided data to the developers of java-based software. I worked also with the installation and administration of WiMAX radio base stations. We helped to analyse and debug both, hardware and software, of our product. The main problems were related to V5.2 switches, data networking, airlink-RF issues (interference), PPPoE sessions. I wrote scripts in Perl and Korn shell as

of University (2006). Collaborative Workshops and courses to: IFETEL (previously COFETEL Mexico), TELKOM Indonesia, Telefonica Spain, among others. I had the opportunity to be the mentor of the high-school final work of a student member of the “Eager for Physics” program in collaboration with Fundació la Pedrera, IFAI (Institute of High Energy Physics) and ICN2 (Barcelona 2016). I have been teacher of robotics, electronics and research methodologies (more than 20 hours per week) for students from K9-12 in Tuxtla Gutierrez, Chiapas (2018-2020). I am being certificated as IB educator. I have been in charge of the development of the STEAM K12 curricula (2020).

### *Organizational*

Founder of the Do-it-Yourself Biology Barcelona community lab (Barcelona, *Fall 2014*). Vice-president of the organizing committee of the 1st international MONABIPHOT alumni conference (Hyeres, France. *Summer 2012*). Assistant in the organization of the EuroT(r)opde XI, the eleventh conference in optical chemical sensors and biosensors in Barcelona, Spain (*April 2012*). Secretary of the Students from Chiapas in Monterrey Association (*Monterrey, 2006*). Assistant in electronics’ symposium in Monterrey and management symposiums in Chiapas.

## COMMUNICATION SKILLS

*”Implementation of a Multiplexed Mach-Zehnder Interferometer Device for Biosensing Applications”*

Daniel Grajales. Director: Prof. Dr. Laura M. Lechuga. Supervisor: Dr. Daphne Duval. **Microthesis Defense for Master Degree** of the program *Molecular Nano and Bio Photonics with Applications for Telecommunications and Biotechnology*. Jury members: Dr. Malcolm Buckle and Dr. Chi Than Nguyen. Ecole Normale Supérieure Paris-Saclay. Paris, France - September 6th 2012

*”Multiplexed Mach-Zehnder silicon interferometers for highly sensitive biosensing”*

Daphne Duval, Daniel Grajales, Stefania Dante, Carlos Domínguez and Laura M. Lechuga. **Oral Presentation** at the European Congress and Exhibition on Advanced Materials and Processes. Sevilla, Spain – 2013

*”Multiplexed Integrated Interferometers for Advanced Lab-on-a-Chip Biosensors”*

Daphne Duval, Daniel Grajales, Stefania Dante, Jhon Osmond, Carlos Domínguez and Laura M. Lechuga. **Oral Presentation** at OSA’s Advanced Photonics Congress 2013. SW3B.3. Optical Society of America – 2013

*”Optimization Study of Bimodal Waveguide Interferometric Biosensor”*

Daniel Grajales and Laura M. Lechuga. **Oral Presentation** at the 2015 European Conference on Lasers and Electro-optics. Paper JSII\_1a\_2. Munich, Germany. European Quantum Electronics Conference – 2015

*”Vertical Adiabatic Taper for Efficient In-coupling in Nano-interferometric Waveguide Biosensors”*

Daniel Grajales, Adrián Fernández Gavela, Carlos Domínguez and Laura M. Lechuga. **Oral Presentation**. Munich, Germany. CLEO / Europe-EQEC – 2017

tools to debug, monitor and measure our system's performance. I acquired experience with E1/T1, VLANs, and SNMP problems debugging. I had written many technical documents for our customers and I still have good reporting skills. Monterrey, Mexico Onsite support for Telefonica Spain: I was in charge of repairs, logistics and technical support for servers, radio, scripting, base stations and CPEs. I did equipment quality control certification. Madrid, Spain. *April - October 2009*. Sales engineer during business negotiations with Maxcom and Digitel in Santa Fe and Puebla. *January - February 2009*. VoIP troubleshooting course with Mediatrix. Monterrey, Mexico. *January 2009*. Wimax Trial in 3.5 GHz with Veracruz University. Xalapa, Veracruz. *December 2008*. Wimax deployment with Matrix Telecoms in Yaounde and Douala, Cameroon. *September - October 2008*. Wimax Training in SR Telecom Headquarters. Montreal, Canada. *July 2008*. Wimax Trial, deployment and equipment certification in Indonesia. *March - April 2008* Integration of Telefonica Switch equipment and VoIP gateways using WiMax equipment. Madrid, *November 2007*. On-site Technical Support for Telefonica Spain in Madrid and A Coruña, Spain. *June 2007*. WiMAX Field trial in Bogotá and Cali, Colombia. *December 2006*. WiMAX training in SRT Headquarters. Montreal, Canada. *September - November 2006*.

JAN - MAY 2006 (PT)

## Monterrey Tech (ITESM) Physics Laboratory Teacher

Teaching in modern physics laboratory during my last semester as student. Led by Quetzal Garcia.

## PUBLICATIONS

**Adrián Fernández Gavela, Daniel Grajales García, Jhonatan Cordoba Ramirez, Laura M. Lechuga.** Last Advances in Silicon-Based Optical Biosensors. *Sensors (Switzerland)*, (16), 285. (2016)

**Ana Belén Gonzalez-Guerrero, Jesus Maldonado, Stefania Dante, Daniel Grajales and Laura M. Lechuga.** Direct and label-free hormone detection in urine by an ultrasensitive Bimodal Waveguide biosensor. *Journal of Biophotonics*, 1-7. DOI:10.1002/jbio.201600154 (IF: 3.8) (2016)

**Nuria Conde Pueyo, Daniel Grajales, Esteban Gimenez, Alvaro Jansà.** DiYbio. Els biohackers: una nova manera de fer creixer la biotecnologia. *Treballs de la Societat Catalana de Biologia (TSCB)*, 61-65 Vol. 67 (2016)

**Grajales García, Daniel.** Lab-on-a-Chip Integration of the Bimodal Waveguide Nanointerferometric Biosensor. *Department of Electronic Engineerig. Autonomous University of Barcelona. PhD Thesis. 2018.* ISBN:9788449082092

**Daniel Grajales, Adrián Fernández Gavela, Carlos Domínguez, Jose Ramon Sendra and Laura M. Lechuga.** Low-cost Taper for high efficient light in-coupling in Bimodal Interferometric Waveguide Biosensors. *IOP Journal of Physics Photonics* Vol. 1. DOI: 10.1088/2515-7647/aafebb (2019)

**Daniel Grajales, Adrián Fernández Gavela, Jose Ramon Sendra and Laura M. Lechuga.** Optical Chirp Modulation of Bimodal Interferometric Waveguide Biosensors for Sensitivity and Readout Enhancements. (2020) *In preparation*

## PROJECTS AND MENTORING

*Project proposal: Development of a SARS-CoV2 POC unit with Bio-EsKan*

**Best Poster Award:** "Simulation and experimental evaluation of optical chirp modulation for bimodal waveguide interferometer biosensor"

Daniel Grajales, Jose Ramón Sendra and Laura M. Lechuga at the European Conference on Integrated Optics in Eindhoven, Netherlands. Optical Society of America - 2017

**Poster** "Multiplexed detection of alternative spliced mRNA isoforms for cancer detection using a bimodal waveguide interferometer"

Daniel Grajales, Cesar S. Huertas, Laura M. Lechuga at VIII International Congress on Analytical Nanoscience and Nanotechnology 2017. Barcelona, Spain. Autonomous University of Barcelona - 2017

**Poster** "Multiplexed photonic nanointerferometric biosensors in silicon nitride for ultrasensitive analysis"

Roger Guiu, Daniel Grajales, Adrián Fernández-Gavela, Carlos Domínguez and Laura M. Lechuga at the European Conference on Integrated Optics. Optical Society of America - 2018

"Lab-on-a-Chip Integration of the Bimodal Waveguide Nanointerferometric Biosensor"

Daniel Grajales Garcia. Director: Prof. Dr. Laura M. Lechuga. Co-director: Dr. Jose Ramon Sendra Sendra. Tutor: Dr. David Jimenez Jimenez. **Thesis Defense for the Philosophy Doctor in Electronics and Telecommunications Engineering Degree.** Jury members: Dr. Pascual Munoz Munoz, Dr. Gonzalo Wangüemert Pérez and Dra. Astrid Aksnes; suplents: Prof. Dr. Pablo Sanchis and Prof. Dr. Xavier Cartoixa Soler. Institut Catala de Nanociencia y Nanotecnologia. Bellaterra, Barcelona, Spain. - September 14th 2018

## DIGITAL SKILLS

SYSADMIN	UNIX (CentOS), Linux, Mac OS and Windows
INTERMEDIATE	Java, HTML, CSS, 3D design with Inventor, fusion 360, google sketch, 2D design with Illustrator, Photoshop, GIMP, Corel DRAW, MySQL, MariaDB, Oracle
ADVANCED	Scripting (Perl and bash), assembler Visual Basic, SQL scripting, Lab View, L <sup>A</sup> T <sub>E</sub> X, Python, C, C++, MATLAB, Arduino systems, National Instruments Tailor-made Hardware and Software Microcontrollers and Microelectronics Data analysis and treatment with Origin, numPy, Pandas, Jupyter notebooks Simulation software for molecular interactions, Monte Carlo simulations, Photon Design (photonic simulations), COMSOL multi-physics Design and deployment of webpages, servers, systems, Databases, websites as a fullstack developer, networks: telephony, coaxial, ethernet, radio, fiber

Participation with this project under the National Program to support Technology and Innovation under COVID19 Emergency by CONACYT, application 313227. Under revision. Submitted on May 25th 2020.

#### *Mentoring of Interdisciplinary Projects*

My students have developed sensors with Arduinos, tracking of bumblebees polinization impact (1st price in the science fair), 3D printing, assembling of Robots (1st prize as driver in the VEX national Robotics). Tuxtla Gutierrez, Chiapas. August 2018 - Ongoing

#### *Analysis of the Systems and DB of CICCH*

Study of the DB and consultant services for the strategic plan of development 2019-2029. Tuxtla Gutierrez, Chiapas. July 2019.

#### *Academic Projects*

I helped teaching students to program and assemble Arduino robots, Research projects with hydroponic gardens and transdisciplinary projects in general. Tuxtla Gutierrez, Chiapas. July 2018-to Date

*Arsenic mobile detection by Metal Organic Framework at fiber optic sensor*

D. Grajales, Abraham Ayala. Participation at "Emerging Technologies Competition 2017" by the Royal Chemistry Society. April 21st 2017.

*Aproximació Interferomètrica als Dispositius de Biosensing Basats en Tecnologies de Guies d'ones Bimodales – o ¿Que hi fa un alumne de primer de batxillerat en un centre de recerca de nanotecnologia?*

Mentorship and co-tutoring of student Albert Lopez Serrano during his summer stay at ICN2. July - November 2016. Barcelona, Spain.

#### *Interferometric Detection in Bimodal Waveguide*

Collaborative project with PROMAX SL. Barcelona, November 2015 – April 2017.

#### *MiNETUR project with PROMAX*

Laura Lechuga, Carlos Dominguez and Daniel Grajales. Funded by AEESD, MINETUR, PROMAX SL January 2015 – April 2017

#### *EPISENS*

Design and development of light in-coupling elements for Bimodal Waveguides. Prototyping of a device for IPSUS detection in ambulances. Patent licensed to PROMAX S.L. Barcelona, Spain. February 2014 – December 2015.

#### *"Spatial Specific RF Activation and its Effect in Endothelin Release"*

GlaxoSmithKline Electroceutical: Innocentive Ideation - Rejected - Virtual Challenge. May 2013. D. Grajales, A. Grajales.

#### *Radiolocalization through WiFi*

Prototype in MATLAB using access points from the Campus wireless network. It was done using channel modeling through statistical approximation. Minimal squares algorithm was used to improve the position estimation based in at least 3 known positions. The GUI was programmed in Matlab. Leded by Dr. Frantz Bouchereau Lara at ITESM. Monterrey, Mexico, January - May 2006.

#### *Automatic Electronic Feeder for Pets*

Prototype with 8051 microcontroler, DC motors, wood, plastic and metallic gratings as part of the Entrepreneur Workshop class. Leded by Dr. Artemio Aguilar at ITESM. Monterrey, Mexico, January - May 2006.

#### *Wifi radiation patterns of home-made Can-tennas*

It was used to amplify the received Signal Strength and Polar plottings were done in Matlab. Leded by Dr. Frantz Bouchereau Lara at ITESM. Monterrey, Mexico. August - December 2005.

## LAB SKILLS

BASIC:	XPRS, evaporators
INTERMEDIATE	Clean and sterile areas Spin coaters, thermal ovens UV-photolithography, Development RIE, TEM, SEM, Poolishers PCRs, Electrophoresis, bacterial cultures
ADVANCED	Optical alignments fiber optic cleaving mold casting, 3D printing CNC fabrication, micromachining PCRs, Electrophoresis, PhMeters, Ozone RIE Sonications, Chemical Etching Design of experiments, Chemical and biological protocols Design and deployment of telecomm labs, makerspaces, biolabs (level I)

## WORKSHOPS AND DIVULGATION

*Lab-on-a-Chip Integration of BiMW Interferometer Biosensor*

Seminar to the SPIE Student Chapter of the Tuxtla Gutierrez Technological Institute (IT<sup>2</sup>G). February 6th, 2020. Tuxtla Gutierrez, Chiapas.

#### *Kitchen made pHmeters*

Workshop at IESA (Institute of Education in Alternative Health) to kids between 6 and 10 years old. February 23rd, 2018. Tuxtla Gutierrez, Chiapas.

#### *PAUTA project (adopt-a-talent project)*

Participation with a video for students. UNAM. Mexico, December 2017.

#### *Booth at Sonar +D, Maker Faire BCN 2017*

We showed a spirulina DIY bioreactor, DIY webcam microscopes and a dust sensor in collaboration with ICN2. Barcelona, Spain. June 16th – 18th 2017.

#### *"Biobacker: Garage vs Institutional Science"*

Invited talk at the first Talentia network meeting. Mexican consulate in Barcelona, Spain. March 31st, 2017.

#### *"Principis Fotònics per a sensors"*

2nd edition of "Bojos per la Física" by Daniel Grajales, Esteban Martin, Gerardo Lopez. Workshop building a Low Cost PM10 dust sensor with Arduino UNO WIFI and Thingspeak IoT cloud service in collaboration with IFAE (High Energy Physics Institute), ICN2, BIST (Barcelona Institute of Science and Technology), Fundació la Pedrera, DiY Bio Bcn. ICN2 building, Bellaterra, Spain. February 4th 2017.

#### *"BiMW updates" seminar*

NanoB2A group. Daniel Grajales. January 2017.

#### *"3D printing 101. Introduction to the 3D printing world"*

Daniel Grajales. Internal workshop at the NANO B2A group. January 2017.

### *Field tests to measure cell phone signal power*

Design of WAP sites. HDB<sub>3</sub> tests. Esslingen, Germany. January - May 2005.

## ACTIVITIES WITH DIYBIO

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### *Lab-on-a-Case artistic project*

Project to close the two years of scholarship by Nina Carasso Foundation. Conceptual lab for genomics analysis. Barcelona, Spain. November 2017.

### *"DiyBio introduction talk and DIY microscopy workshop"*

Diy Bio Barcelona at Baumann Lab – Laboratori de Creació Jove. October 19th, 2017. Terrassa, Barcelona, Spain.

### *Open day at PRBB*

Workshop: "Culture your own microorganisms". 45 attendants. Comparison of DIY/industrial culture media for *Lacto Bacillos*, *Vibrio Fishceri*, *Saccharomyces Cerevisiae*. October 7th, 2017. Barcelona, Spain.

### *In<sub>3</sub>Dustry congress*

Participation with *Spyrulina* bioreactor at fablab booth. October 3rd – 5th 2017. Barcelona, Spain.

### *Interactive conferences of Prototypome*

Showing the works of the last two years: cellular handcraft, photodynamic therapy, DIY paper centrifuge. Participation with a lab-on-a-briefcase including centrifuge, PCR, electrophoresis, transilluminator, incubator and sample holders. September 28-30th. Barcelona, Spain.

### *Ryan Hammond and Mary Maggic artist in residence*

"Cultivation, extraction and use of *Schizophyllum Commune*: cancer prevention through elaboration of *schizophyllum* cheese, treatment of cervical cancer and treatment of contaminants in the Anoia River". September 12-27th 2017. Barcelona, Spain.

### *Phage Free Lab*

Workshop "Bacteriophages as an alternative to antibiotics to treat bacterial diseases". Barcelona, Spain. July 3rd – 6th 2017.

### *Booth at Sonar +D and Maker Faire*

showing a *spirulina* DIY bioreactor, DIY webcam microscopes and a dust sensor in collaboration with ICN<sub>2</sub>. Barcelona, Spain. June 16th – 18th 2017.

### *Ironhack Barcelona*

Participation with talk "Biohacking: garage-disruptive innovation" and invited qualifier jury in "Disruptive innovation with design thinking" workshop. Barcelona. May 25th 2017.

### *"My illness is an artwork"*

collaboration with *Quimera Rosa* collective as second artist residence in Hangar. March 2017.

### *PRBB open day 2016*

workshop "Building a spectrophotometer with your smartphone". October 2016.

### *Open Thursday sessions in 4S/EASST*

Participation with demos at the Science and Technology by other means: exploring collectives, spaces and futures workshop. Barcelona 2016.

### *"That's me" biobacking article*

ICN<sub>2</sub> newsletter. Barcelona, March 2016.

### *"Letter from a Scientist"*

It is a social project to send letters from scientist to Mexican children organized by the Nuclear Science Institute of the Autonomous National University of Mexico (UNAM). Barcelona, Spain. December 2016.

### *"Student in the mornings, biobacker at night"*

Oral presentation. Daniel Grajales in CSIC residence of researchers. November 14th 2016.

### *Implementation of a multiplexed Mach-Zehnder Interferometer device for biosensing applications*

D. Grajales. FABio: Fab Festival Bio Hacking Panel. I participated in a biohacking round table at FABLAB 10th congress. Moderated by Dr. Cristina Pujades. Barcelona, Spain. July 5th 2014.

### *"Biobackers and the DIY biologist"*

Daniel Grajales. Oral presentation in 2nd Scientific Meeting of BNC-b students. UAB, Barcelona. June 29th, 2016. Second prize for best oral presentation.

### *Internal Workshop*

Nanobiosensors and Bioanalytical Applications group. June 10th 2015.

### *"Biosensors and DIY Biotechnology for food detection"*

D. Grajales. Seminar to Veterinary School PhDs at UAB. Spain. May 28th 2015.

### *Booth stand*

System demos with EdenRock Communications at XI Mobile World Congress. Barcelona, Spain. March 2015.

### *Booth stand*

Demos, trials and business meetings with Self-Organizing-Network system from Eden Rock Communications Inc. at X Mobile World Congress. Barcelona, Spain. February 2014.

### *"Design and fabrication of Multiplexed Mach-Zehnder interferometer for biosensing"*

Grajales D., Dante S., Duval D., Lechuga L. M. PhoBiA Annual Nanophotonics International Conference. April 12th - 14th 2012. Wroclaw, Poland.

## SPORTS AND HOBBIES

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Yoga, rock climbing, bicycle, surfing, alpinism, snowboarding, skiing, longboarding.

I was drum player at Zombie Jazz Project and eventual guitar, bass and drum jammer in Barcelona scene.

Folkloric dancer in show Raíces 2006.

I was bass player at the XIV song's Festival representing Chiapas campus.

I participated in two classic guitar recitals showed in Tuxtla Gutiérrez, Chiapas.

I was actor in several theatres plays and I am still an amateur photographer.

I organized the Chiapas chapter of "31k portraits for peace" with Diego Huerta photographer.

### *“Arduino for Beginners Workshop”*

Girls in lab hackaton at Universitat Pompeu Fabra. Barcelona. March 13th 2016.

### *Interview by Bio-Science*

February 26th, 2016.

### *substitute Judge during the “First Lego League”*

Volunteer at TrashTrek and WasteWise. Lleida, Catalunya. February 2016.

### *Mini Maker Faire*

Booth showing our latest activities at Cosmo Caixa Museum between citizens, makers and hackers. Barcelona. February 7th, 2016.

### *Daniel and Nina Carasso Scholarship*

Prototypome is a multidisciplinary project between DIYBIO, Hangar foundation and the Biomedical Research Center of Barcelona (PRBB) awarded with a scholarship from “Daniel and Nina Carasso Foundation” – DANONE® to realize the project “Hangar – Fundacion Privada AAVC: citizen art projects 2015 – Setting up the knowledge to better understand the challenges of the modern world” to build a platform of exchange between artists, scientists, hackers, makers and different communities focusing mainly in the development of low cost tools for self health diagnostics. Four scholarships were granted out of thirty-two Spanish projects applications and fourteen bourses out of eighty-one for France. Barcelona, January 2016- December 2017.

### *+Humans*

second edition art exhibition with three projects in Contemporary Cultural Center of Barcelona (CCCB) from October 2015 to April 2016. Barcelona, October 2015.

### *Citizen Science Contest*

organized by “El Temps” newspaper. Fourth place (out of 150) with the Biostrike project. Barcelona, July 2015.

*Çafè Scientique: Biohackers: experimentar I innovar de forma comunitària ”*

Casa Orlandai. Barcelona. May 2015.

### *citizen days at Design Museum*

Booth showing workshops and experiments for kids. Barcelona, April 2015.

### *First BioHack Academy*

Organizer of the Barcelona hub. 10 weeks course on how to set up a biolab. February – April 2015.

### *“Overview of the DIY BIO movement”*

Seminar to UPF (Pompeu Fabra University) biomedicine students. Barcelona. January 30th 2015

### *DNA homemade extraction workshop*

First workshop at Made-BCN. Barcelona. January 30th 2015.

### *homemade microscopy*

Workshop at MADE-BCN. Barcelona. July 2014.

### *Homebrew beer project BioBeer*

Barcelona, Spain. 2014.

## OTHER ACTIVITIES

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### *Invited Proctor*

State Mathematics Olympiad. ASFC A.C. Tuxtla Gutierrez, Chiapas. February 29th 2020.

### *Invited Judge*

Pre-national VEX Robotics Contest 2019 (Elementary, High School and University). Tuxtla Gutierrez, Chiapas. February 22nd, 2019.

### *Chiapas Node of the Mexican Network of Talents*

Talk of Eng. Luis Valdes. Head of Mission MARS 2020 Lab in California, USA. Tuxtla Gutierrez, Chiapas. February 9th 2019.

### *Invited Proctor*

State Mathematics Olympiad. ASFC A.C. Tuxtla Gutierrez, Chiapas. February 2nd 2019.

*Living Photonics: Lab-on-a-Chip technologies for light coupling into biological cells*

Attended to thesis defense by Tobias Nils Ackerman. National Center of Microelectronics Barcelona, Spain. November 9, 2017.

*Second workshop on PICS for Telecom and Bio/life sciences*

Organized by PIC4TB, network of excellence on PICs in Spain. October 26-27th 2017. CTTC Castelldefells, Barcelona, Spain.

### *EUROPTRODE XI*

Photographer and organizer assistant. Barcelona, Spain. April 2012.

## STARTUPS AND COMPANIES

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### *Founder of SmartGridTGZ*

Technology startup in Chiapas focused in software, Websites, Data analysis, IT and Telecommunications systems, Domotics and Photovoltaic technologies. Tuxtla Gutierrez, Chiapas. January 2020

### *Intringulis*

Technology startup created in Barcelona. 2017.

### *Institute of Education on Alternative Health*

Technical Advisor and Investor. Tuxtla Gutierrez, Chiapas. June 2016.

### *Stakeholder and investor of “Marie Antoinette”*

Coffeeshop in Tuxtla Gutiérrez, Chiapas. México, December 2015 – May 2016

### *Websites*

Development, installation and maintenance of: [www.decachef.com](http://www.decachef.com) (2012 - 2015), [www.mentesquetransforman.com](http://www.mentesquetransforman.com) (2012 to 2020) and [www.cocinaholistica.com](http://www.cocinaholistica.com) (2017 to date). Deployment of [www.cicch.org.mx](http://www.cicch.org.mx) on March 2018. Design and Deployment of [www.colegiodearquitectoschiapanecos.org.mx](http://www.colegiodearquitectoschiapanecos.org.mx) (2019 - to Date).

### *PROCOSUR SA de CV*

Advisor and Investor since 2013.

## NETWORKS

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AllBiotech applications reviewer (2020)  
OSA Early Career Member (2020)  
Mexican System of Researchers (2019).  
IEEE Sensors Reviewer (2019).  
SPIE Early Career Member (2019).  
RENIECYT member 1900739 (2019).  
Member of the Union of Concerned Scientist (2017).  
Member of The Science Advisory Board (February 2017).  
Network of Mexican Talents Barcelona Chapter (2016).  
Optical Society of America (OSA) graduate student (2015).  
IEEE Europe section graduate student member (2014).  
MADE-BCN member since 2014 until January 2016.  
VP of MONABIPHOT Alumni Association (2012).  
Member of the DiyBio network (2014).  
Member of Syntechbio network (2017).  
Member of the NuM undo ecovillages network (2013).  
Member of Ex-a-Tec (2006).  
Orcid: 0000-0003-0898-4975  
Research Gate: DanielGrajales4  
Web of Science Researcher ID: L-8315-2016

## CERTIFICATIONS AND COURSES

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*2020 OSA Congress on Laser and Electro Optics (CLEO)*

Participation. May 11th - 15th 2020. Online.

*2020 OSA Biophotonics Congress: Biomedical Optics*

Participation. April 20th - 23rd 2020. Online.

*Introduction to R for data science and statistical programming*

Coursera 4 weeks course by UNAM. Completed on May 25th 2020.

*Journal discussion with Allbiotech 2018*

Participation in Fridays for journal discussions. April 10th 2020. Online.

*Certification on Clusters and Storage for High Performance Computing*

LARCARD-UNACH and UNAM Nuclear Sciences Institute. November 2019 - March 2020

*MYP program: from principles to practice*

International Baccalaureate (IB) certification. February 3rd 2020. Tuxtla Gutierrez, Chiapas.

*Laser Safety training*

Certification by ProcareLight. December 1st 2017. Barcelona, Spain.

*An Introduction to code of Good Research Practices*

Josep Santaló UAB Ethics committee. March 17th, 2017. Barcelona, Spain.

*9th Advanced Studies Course in Optical biochemical Sensors*

(www.ascos.org). Summer school including biosensors design. Porto, Portugal. July 22nd – 29th 2015.

*Summer School*

Molecular Nano and Biophotonics for Telecommunications and Biotechnology Students. Attendant. Frejus, France. June 26th – July 2nd 2011.

## VOLUNTEERING ACTIVITIES

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*The World if Fun*

Volunteering in a local festival in Seattle, WA. August 2013.

*31k portraits for peace*

I was in charge of directing and organizing the intervention of photographer Diego Huerta in Chiapas. He tried to capture 31k portraits of people asking for peace in Mexico. Chiapas, Mexico. July 2011.

*Social Service*

I designed web sites for non-government organizations in Chiapas, Mexico (orphanages and health centers) along with two more students from my University (2004). I provided On-line support to students located in marginal regions in Nuevo Leon through PrepaNET program from Monterrey Tech (2005).

## REFERENCES

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### **Prof. Laura M. Lechuga**

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EMPLOYER *Institute of Microelectronics of Barcelona*  
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POSITION Assistant Professor  
EMPLOYER *University of Oviedo*  
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POSITION Postdoctoral Research Associate  
EMPLOYER *Princeton University*  
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POSITION Assistant Professor  
EMPLOYER *Universidade Federal de Minas Gerais*  
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POSITION VP of Eng. Services  
EMPLOYER *Spectrum Effect Inc.*  
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EMPLOYER *Pivotal Software*  
EMAIL juan.olivo@pivotal.com

### **Dr. Nuria Conde Pueyo**

POSITION Chief Scientific Officer  
EMPLOYER *Moirai Biodesign*  
POSITION Postdoctoral Research Scientist  
EMPLOYER *Universitat Pompeu Fabra*