Lato

JOSÉ MANUEL REQUENA PLENS

R&D Engineer specializing in Embedded Systems & Acoustics.
Software Engineer.

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For more information you can click on the name of places, certificates or courses that appear in the curriculum.

WORK EXPERIENCE

Software Engineer

Power Electronics

Abril 2023 – currently | R&D Department. Solar area.

Embedded software developer for power electronics equipment related to solar energy: inverters, converters, chargers, grid links, etc.
Implementation of new functionalities and bug fixes.

Some tasks:

- Embedded software development in C.
- Performing unit tests with Ceedling.
- Versioning of implementations through GIT.
- Use of tools: CLion, VS Code, Keil, GitLab.
- Agile Methodologies: scrums, kanban, etc.

Predoctoral researcher

Polytechnic University of Valencia + CSIC + Hospital La Fe + AVI

Enero 2023 – April 2023 | Medical Imaging and Therapy Systems i3M

Researcher in the R&D line: **Acoustic Metamaterials for Ultrasound Histotripsy treatments**.
Project: New generation of smart metasurfaces based on additive manufacturing for strategic applications in telecommunications (Metasmart). Funded by the Valencian Agency for Innovation (Reference: INNEST/2022/345).

- Ultra-close focus acoustic lens design.
- Prototype manufacturing.
- Experimentation with ex-vivo tissues.

Predoctoral researcher

Polytechnic University of Valencia + CSIC

July 2021 – July 2022 | Medical Imaging and Therapy Systems i3M

The main objective is to conduct research and development of acoustic metamaterials for use in architectural applications and medical imaging.
Goals achieved:

- Theoretical development of acoustic metadiffusers based on membranes or plates reducing the size of commercial diffusers.
- Simulation of the acoustic diffusers and validation of results (MATLAB & COMSOL).
- Two publications in national and international congresses:
  - Tecniacústica - **Beyond Schroeder diffusers using acoustic metasurfaces**
  - Euronoise - **Sound diffusing metasurfaces based on elastic plates and membranes**
- Development and simulation of metamaterial-based waveguides for improved ultrasound resolution in air.
- Fabrication of waveguide prototypes.
- Validated experimental results against those obtained in simulation.
- Advisor of the Master thesis of a student of the Master's Degree in Acoustic Engineering of the UPV.

Researcher in European project

Higher Polytechnic School of Gandia

February 2020 – July 2021 | Complex Media Acoustics Group of IGIC

Implement and experimentally validate a sound mitigation method, applicable to a real space vehicle launch configuration (VEGA), that results in a significant decrease in sound pressure levels generated in the launch area during spacecraft liftoff.

Project funded by ESA (European Space Agency) with reference ESA AO/1-9479/18/NL/LvH, in collaboration with: CNRS/Laboratoire d'Acoustique de la Université du Mans; COMET Ingeniería; Spanish National Research Council (CSIC) and Polytechnic University of Madrid.

All project objectives were completed at 100%:

- Design of the optimum geometry of the acoustic metamaterial to reduce noise levels.
- Simulation of a real environment to validate design performance (MATLAB, COMSOL & Python).
- Design of the industrial model for the manufacture of the prototype by means of plastic injection.
- Development of software for acoustic measurements according to ISO 10534-2:1998 and ASTM 2611-19 standards. **A|Lab**.
- Design and development of a 3-axis robotic system to perform experimental measurements. Photos and some information here: **NEWS**.
- Results validated and accepted by ESA.
- Three publications/presentations at international congresses (Euronoise and ECSSMET) and one at a national congress (Tecniacústica):
  - Euronoise - **Perfect broadband sound absorber metamaterial for noise reduction in a rocket launch**
  - Euronoise - **Application of metamaterials to control noise scattering during space vehicle lift-off**
  - ECSSMET - Launch sound level characterisation and mitigation: numerical modelling framework and metamaterial proof of concept
  - Tecniacústica - **Acoustic field prediction during the launch of rockets**

Research internship

Dep. of Physics, Systems Engineering and Signal Theory

February 2018 – July 2018 | University of Alicante

Internship in different research projects in the **Applied Acoustics Group**, belonging to the University Institute of Physics Applied to Sciences and Technologies of the Higher Polytechnic School of Alicante.
Goals achieved:

- Simulation of acoustic models.
- Acoustic measurements by means of a LabView-controlled robotic system.
- Investigation of the acoustic radiation efficiency (Vibration-borne noise) of metallic plates for an initial study of ship noise emissions in water. Carried out in collaboration with SAES, here you can read a news item on the subject: **NEWS**.
- A publication at a national congress:
  - Tecniacústica - **Comportamiento vibroacústico de contenedores cilíndricos en aire**

Founder and Vocal Member

AμTech

Septiembre 2016 – Julio 2018 | University of Alicante

Association based at the Higher Polytechnic School of the University of Alicante. Founded in 2016. Promotes project-oriented microcontroller programming knowledge.
Activities performed:

- Group classes of reinforcement and extension of the subject "Digital Electronic Systems" of the Degree in Sound and Image Engineering of the University of Alicante.
- Laboratory organization and planning (located at the Colegio Mayor).
- Communication and Public Relations.

Sound technician

Acusticox

June 2011 – February 2018 | Cox, Alicante

- Equipment installation and adjustment for events.
- Equipment installation and adjustment for permanent installation.
- FOH Technician.
- Customer acquisition.

Laboratory technician

Profdent

September 2005 – November 2009 | Alicante

- Reception of work from dentists.
- Model preparation and retouching.
- Minor responsibilities.

OTHER KNOWLEDGE AND SKILLS

Embedded Firmware & Electronics

- C
- STM32 & ARM
- Comm. Protocols
- Keil uVision
- Instrumentation
- Espressif / Arduino

Software Engineering & Tools

- Python
- C++
- Git
- MATLAB
- CMake
- JetBrains Toolbox

Simulation & Acoustics

- COMSOL Multiphysics
- LabView
- CATT-Acoustic
- EASE

General & Platforms

- Linux / Unix
- MacOS
- Windows
- LaTeX
- HTML / CSS

EDUCATION

Formal education

PhD in Health and Wellness Technologies

Polytechnic University of Valencia

September 2020 – 2023 | Medical Imaging and Therapy Systems i3M

Title Industrial and biomedical applications of metamaterials for the control of acoustic beams. In this project, we propose to combine new air-coupled ultrasound transducers with hyperbolic metamaterials to design vision systems that exceed the imaging capabilities of traditional systems.

Description During my PhD in Acoustic Engineering applied to Biomedicine, I conducted advanced research:

- Biomedical signal processing and acoustic analysis algorithms.
- Ultrasound characterization for medical applications.
- Computational modeling and simulation of acoustic phenomena.
- Development of experimental methodologies for biomedical studies.
- Publication of results in specialized conferences and journals.

After nearly completing the doctoral program, I made the strategic decision to redirect my career toward industrial software development. This transition allowed me to apply my solid foundation in data analysis, programming, and analytical thinking to the software sector, where I found a more direct alignment between my technical skills and my long-term professional goals.

Academic record

Master's Degree in Acoustical Engineering

Polytechnic University of Valencia

September 2018 – June 2019 | Higher Polytechnic School of Gandia

Degree obtained with honors in: Fundamentals of Acoustics, Acoustic Isolation, Musical Acoustics, Signal Processing in Acoustic Engineering, Ultrasonics and Acoustic Simulation Techniques.

Final Master's thesis entitled "Difusores acústicos basados en resonadores de membrana y placa" ("Acoustic diffusers based on membrane and plate resonators"), qualified with honors with special mention.

Diploma | Academic record

Degree in Telecommunication Engineering in Sound and Image

Universidad de Alicante

Julio 2018 | Higher Polytechnic School

Degree obtained together with the 2 specializations: Acoustic Engineering and Audiovisual Technology.

Final Degree Work entitled "Estudio de la relación campo directo/reverberado; útil/perjudicial" ("Study of the direct/reverberated field relationship; useful/harmful").

Diploma | Academic record

Certificate of Higher Education in Electronics Technician & Superior Sound Technician

IES Salesianos (San Jóse Artesano) | IES Luis García Berlanga + Ciudad de la Luz

2009 | 2011 | Elche | Alicante

Diplomas

CERTIFICATES

The certificates can be accessed by clicking on the name of each one.

Occupational Health and Safety

Generic	INVASSAT. **50** H.
Nanomaterials	INVASSAT. **50** H.
Chemical sector	INVASSAT. **50** H.
Emergencies	INVASSAT. **70** H.
Nutrition	INVASSAT. **50** H.
Educational	INVASSAT. **50** H.
Services	INVASSAT. **50** H.
Researcher	UPV. **15** H.

Labor/Industrial

Op. industrial trucks	Gescoform. **15** H.
Food Hygiene Course	Asonaman. **30** H.
Self-protection plans	INVASSAT. **15** H.
Static electricity	INVASSAT. **15** H.
Protección de datos	CSIRT-CV. **10** H.

Transversal competences

Gender perspective	EVES. **20** H.
Teamwork	Labora. **25** H.
Design Thinking	Labora. **25** H.
Critical thinking	Labora. **25** H.
Adaptability, flexibility	Labora. **25** H.
Autonomy, innovation	Labora. **25** H.
Prof. efficiency	Labora. **25** H.
Entrepreneurship	UPV. **20** H.

Information technology

Using Python for Research	HarvardX. **50** H.
Analyzing Data w/ Python	IBM. **20** H.
Visualizing Data w/ Python	IBM. **20** H.

Courses and seminars

- **Use and characterisation of new acoustic treatments and tools**. European Cooperation in Science and Technology (COST). 15 Hours.
- **Numerical methods with MATLAB**. UPV. 50 Hours.
- **Composition of high quality documents and presentations with LaTeX**. UPV. 56 Hours.
- **Scientific computing**. UPV. 50 Hours.
- **Gender perspective in research**. UPV. 50 Hours.

PUBLICATIONS

Some publications have been presented at conferences, most of the slides are available on my website: **jmrp.io/publications**.

- Escartí-Guillem, M. S., Feijoo, P. B., Cebrecos, A., Manguán, M. C., Parra, P. C., Raffi, L. M. G., … Millán, E. R. (2021). Application of metamaterials to control noise scattering during space vehicle lift-off. In S. P. de Acústica (SPA) (Ed.), *European congress and exposition on noise control engineering (euronoise 2021)* (pp. 1287–1296). Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Euronoise/EscartiEuro2021.pdf
- Escartí-Guillem, M. S., Requena-Plens, J. M., Feijoo, P. B., Cebrecos, A., Manguán, M. C., Parra, P. C., … Ngan, I. C. (2021). Launch sound level characterisation and mitigation: Numerical modelling framework and metamaterial proof of concept. In G. A. Center (Ed.), *16th european conference on spacecraft structures, materials & environmental testing*.
- Requena-Plens, J. M., Groby, J.-P., Jiménez, N., & Romero-García, V. (2021). Sound diffusing metasurfaces based on elastic plates and membranes. In S. P. de Acústica (SPA) (Ed.), *European congress and exposition on noise control engineering (euronoise 2021)* (pp. 1279–1286). Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Euronoise/plensEuro2021_2.pdf
- Requena-Plens, J. M., Picó, R., Sánchez-Morcillo, V. J., Jiménez, N., Cebrecos, A., & Escartí-Guillem, M. S. (2021). Perfect broadband sound absorber metamaterial for noise reduction in a rocket launch. In S. P. de Acústica (SPA) (Ed.), *European congress and exposition on noise control engineering (euronoise 2021)* (pp. 1392–1400). Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Euronoise/plensEuro2021.pdf
- Jiménez, N., Cox, T. J., Requena-Plens, J. M., Ballestero, E., Groby, J.-P., & Romero-García, V. (2020). Beyond schroeder diffusers using acoustic metasurfaces. In S. E. de Acústica (Ed.), *Tecniacústica 2020: 50º congreso español de acústica. xi congreso ibérico de acústica. faro, portugal.* Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Tecniacustica/JimenezTEC2020a.pdf
- Requena-Plens, J. M., Jiménez, N., Cebrecos, A., Picó, R., & Sánchez-Morcillo, V. J. (2020). Acoustic field prediction during the launch of rockets. In S. E. de Acústica (Ed.), *Tecniacústica 2020: 50º congreso español de acústica. xi congreso ibérico de acústica. faro, portugal.* Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Tecniacustica/plensTEC2020.pdf
- Castells, F., & Requena-Plens, J. M. (2019). Loudspeakers for vented enclosures: A backwards approach for speaker selection (love bass). *Voice Coil.*, *9 (32)*, 18–21. Retrieved from https://jmrp.io/pdf/paper-resources/Articles/castells2019.pdf
- Requena-Plens, J. M. (2019). *Difusores acústicos basados en resonadores de membrana y placa* (Master's thesis, Universitat Politècnica de València. Departamento de Física Aplicada. Escuela Politécnica Superior de Gandia.).
- Ramis, J., Carbajo, J., González, J. d. D., Poveda, P., Requena-Plens, J. M., Segovia, E. G., et al. (2018). Aprendizaje basado en proyectos en las materias transductores acústicos y vibroacústica. In *Memorias del programa de redes-ice de calidad, innovación e investigación en docencia universitaria. convocatoria 2017-18.* (pp. 1487–1501). Universidad de Alicante. Instituto de Ciencias de la Educación. Retrieved from http://hdl.handle.net/10045/89633
- Requena-Plens, J. M. (2018). *Estudio de la relación campo directo/reverberado; útil/perjudicial* (Master's thesis, Universidad de Alicante. Departamento de Física, Ingeniería de Sistemas y Teoría de la Señal.). Retrieved from http://hdl.handle.net/10045/77578
- Requena-Plens, J. M., & Vera Guarinos, J. (2018a). Cálculo corregido, basado en la teoría moderna, de los campos acústicos (directo, temprano y tardío). In S. E. de Acústica (Ed.), *Tecniacústica 2018: 49º congreso español de acústica; xi congreso iberoamericano de acústica; x congreso ibérico de acústica.* Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Tecniacustica/plens2018.pdf
- Requena-Plens, J. M., & Vera Guarinos, J. (2018b). Campo directo (útil)/reverberado (perjudicial) resultados experimentales frente a simulación en ease. In S. E. de Acústica (Ed.), *Tecniacústica 2018: 49º congreso español de acústica; xi congreso iberoamericano de acústica; x congreso ibérico de acústica.* Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Tecniacustica/plens2018-2.pdf
- Rodrigo, F. J., Poveda, P., Carbajo, J., Requena-Plens, J. M., & Ramis, J. (2018). Comportamiento vibroacústico de contenedores cilíndricos en aire. In S. E. de Acústica (Ed.), *Tecniacústica 2018: 49º congreso español de acústica; xi congreso iberoamericano de acústica; x congreso ibérico de acústica.* Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Tecniacustica/saura2018.pdf
- Requena-Plens, J. M., Guarinos, J. V., & Calleja, M. S. Y. (2017). Campo directo (útil)/reverberado (perjudicial) resultados experimentales frente a simulación en catt-acoustic. In S. E. de Acústica (Ed.), *Tecniacústica 2017: 48º congreso español de acústica; encuentro ibérico de acústica; european symposium on underwater acoustics applications; european symposium on sustainable building acoustics.* Retrieved from https://jmrp.io/pdf/paper-resources/Conferences/Tecniacustica/plens2017.pdf