

Luis Borunda, PhD

Licensed Architect, Visiting Assistant Professor of Practice, LEED GA

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PROFESSIONAL SUMMARY

Areas of expertise include computational design, design for additive manufacturing, robotic fabrication, sustainability, quantitative and qualitative research methods, architecture technology, biomimicry, and physical computing.

ACADEMIC APPOINTMENTS:

Visiting Assistant Professor of Practice, Virginia Tech August 2022 - Present

WORK HISTORY

Virginia Tech, College of Architecture and Urban Studies 2019 - 2022

Senior Research and Project Associate

Carnegie Mellon University, School of Architecture 2018

Visiting Scholar

Self Employed – Licensed Architect 2017 – 2020

Computational designer and technology consultant

Sancho Madridejos Architecture Office 2015 – 2017

Project Architect

Cloud 9 – Enric Ruiz Geli 2009 – 2015

Project Architect

Universitat Politècnica de Catalunya 2009 – 2012

Research Associate

EDUCATION

Ph.D. CUM LAUDE, International Doctorate, Universidad Politécnica de Madrid, Spain 2016 - April 2021

- Dissertation: [Digital 3D Printing, Design and Fabrication of Continuous Surfaces](#) ↓

BS - MSc. Arch. Universitat Politècnica de Catalunya, Barcelona, Spain 2005 - 2013

TEACHING EXPERIENCE:

Visiting Assistant Professor of Practice, Virginia Tech

2022

- Coordinator of the Clay 3D Printing Lab
- Architecture III Studio 3015, coordinator and instructor, Fall 2022
17 undergraduate students, 7 credits
Introduction to computational design and physical computing with Python and Arduino
- Research Methods 5045, coordinator and instructor, Fall 2022
10 graduate students, 3 Credits
Thesis advising (academic writing, methods, and research proposal) of MSc., March., and PhD students
- Digital Fabrication Studio, consultant, Spring 2022
15 graduate students

Workshops designed and taught

- Robotic Fabrication and Computational Design Workshop, Instituto Europeo di Design, Madrid, Spain, 2019
- Experimental Social Housing Study Abroad Program, Instituto de Arquitectura Avanzada de Cataluña, Instituto Tecnológico y de Estudios Superiores de Monterrey, Querétaro, Mexico - Barcelona, Spain, 2014
- In2Space Parametric Design Workshop, Arab International University of Damascus, Universitat Internacional de Catalunya, Barcelona, Spain, 2012
- Proyectos Integradores, Instituto Tecnológico y de Estudios Superiores de Monterrey ITESM, Mexico, 2012

RESEARCH EXPERIENCE :

- Living Labs by the Global Forum on Urban and Regional Resilience, Virginia Tech de Catalunya, 2019-2022
“Cloud”, central pavilion for CaixaForum Valencia museum, Spain
Works included creating computational designs for robotic additive manufacturing, leading and supervising the execution of the cloud 3d printed cellular shell for CaixaForum Valencia museum.
“CID LLC building Living Labs”, Blacksburg, Virginia, USA
Works involved co-leading design and build initiatives and contributing inside a Virginia Tech Capital Project: CID LLC Building. Key contributor in securing sponsorships and materials donations. Total budget of 1.5M
COVID 19 action plan
Design and implementation of COVID safe spaces and installation of temporary teaching spaces
- Consejo Nacional de Ciencia y Tecnología de México (CONACYT) federal grant, 2016 - 2019
Doctoral research grant awarded the government of Mexico number 439983 for the international doctoral research in the national interest field of construction technology, 115,200 euros.

- Solar Decathlon Europe Projects: Universitat Politècnica de Catalunya, 2010 & 2012 editions
 - **(e)co house – UPC Solar Decathlon Europe 2012**, Barcelona, Spain. Project co-director. Project architect for the international competition entry. International press and TV coverage. Project built and showcased at the Villa Solar event in Madrid during Sept 2012
 - Role: Codirector and Project Architect
 - Total research investment 264,811.27 euros
 - **Low3 house - UPC Solar Decathlon Europe 2010**, Barcelona, Spain. Project architect. International Press coverage, project built and showcased at the Villa Solar event in Madrid during Sept 2010, and the Venice Biennale 11th Architectural Exhibition
 - Role: Communications Director and Project Architect
 - Total research investment 434,036.59 euros
- Fellowship grant awarded the Ministerio de Educacion of Spain for research at the Department of Architectural Projects “BOE Orden EDU/1868/2011”, Barcelona, Spain, 2011.

PUBLICATIONS

Peer-reviewed journal publications

- **SJR Q2 Arts and Humanities: Borunda, L.**, Anaya, J., “Hierarchical Structures Computational Design and Digital 3D Printing”, Journal of the International Association for Shell and Spatial Structures IASS, 63(4), 2022, DOI:10.20898/j.iass.2022.015
- **SJR Q3 Building and Construction: Rodriguez, M., Borunda, L.**, et al., “Multi-resolution in architecture as a design driver for additive manufacturing applications” International Journal of Architectural Computing, 8(3), 2020, pp. 218 – 234, DOI 10.1177/147807712092480218
- **Borunda, L.**, Rodríguez, M., et al. “Additive Manufacturing Building Components”, Análes de Edificación. 6(2), 2019, pp. 7 – 19, ISSN 2444-1309

Peer-reviewed conference publications

- **Borunda, L.**, Rodríguez, M., et al., “Design Method for Optimized Infills in Additive Manufacturing Thermoplastic Component”, In: Sousa, J. et al (Eds), Proceedings of 37th eCAADe and XXIII SIGraDi Joint Conference, Architecture in the Age of the 4Th Industrial Revolution, São Paulo, Blucher, 2019, pp. 493 - 504, DOI: 10.5151/proceedings-ecaadesigradi2019_628
- Aguilar, P., **Borunda, L.**, Pardal, C., “Additive manufacturing of variable-density ceramics, photocatalytic and filtering slats”. In: Werner, L. & Koering, D., (Eds.), Anthropologic-Architecture and Fabrication in the Cognitive Age Proc. of the eCAADe, 38, 1, TU Berlin, Germany, 2020, pp. 97 – 105, DOI: 10.52842/conf.ecaade.2020.1.097
- Rodríguez, M., **Borunda, L.**, et al., “Robotic Free-Oriented Additive Manufacturing Technique for Thermoplastic Lattice and Cellular Structures”, In: Proceedings of CAADRIA 24th Annual Conference Intelligent and Informed, Wellington, New Zealand, 2019, pp. 333-342, DOI: 10.52842/conf.caadria.2019.2.333

- **Borunda, L.**, Rodriguez, M., Anaya, J., “Human-Machine collaboration practices for manufacturing digitally designed complex surfaces”. In: Casinello, P., Blazquez, A., Sanchez, M., Sorlí, A., (Eds.), Proceedings of the International Conference on Construction Research: Architecture Engineering, and Concrete, Fundación Eduardo Torroja CSIC, Madrid, Spain, 2018, pp. 455-463, ISBN 978-84-941820-8-2
- **Borunda L.**, Rodriguez, M., “Free-Oriented Additive Manufacturing novel technique”, ROB | ARCH 2018: Radical Crossdisciplinarity Call for Video, Zurich, 2018, [video] <https://vimeo.com/287697164>

Book sections

- **Borunda, L.**, Rodriguez, M., et al., “Automatización de la Construcción: Oportunidades y Retos hacia los Objetivos de Desarrollo Sostenible”, In: Gonzalez, F., Cordova, F., Gomez, J., (Eds) “Habitat, Vivienda y Construcción 4.0”, pp. 13-39, Universidad de Guadalajara, 2020, ISBN 978-607-571-041-9
- Rodriguez, M., **Borunda, L.**, et al., “Multi-resolution based design methodology for architectural design”, In: Lee, J., (Eds) Computer-Aided Architectural Design. "Hello, Culture". CAAD Futures 2019. Communications in Computer and Information Science CCIS Revised Selected Papers, Vol 1028. Springer, Singapore. DOI: 10.1007/978-981-13-8410-3_7
- Rodríguez, N., **Borunda, L.**, et al., “Vivienda Progresiva en Zonas Marginales: Caso de estudio Ciudad Juárez”, In: Nolazco, G., (Ed.), “Co-Beneficios de la Vivienda Sustentable en México”, Universidad Autónoma de Chiapas, Tuxtla Gutiérrez, Mexico, 2015, pp. 171 – 179, ISBN 978-607-8459-71-1

CONFERENCES

- “La Nube”, CaixaForum Valencia Museum Inaugural Conference, Valencia, Spain, 2022
- “El impacto ambiental de la automatización de la construcción y la fabricación aditiva de gran escala”, Semana de la ingeniería IIT, Universidad Autónoma de Ciudad Juárez, Mexico, 2018
- “Energy Efficient Housing Prototypes” Universidad Autónoma de Querétaro, Mexico, 2013
- “Solar Decathlon Europe” ITESM campus Querétaro, Mexico, 2013
- “CFD Simulation and Design Methodologies for Energy Efficient Design” Universitat Internacional de Catalunya, Barcelona, Spain, 2011
- “Passive Architecture Case Studies”, College of Architects of Madrid, Spain, 2012
- “Low Energy, Low Impact, Low Cost” Universidad de Alcalá de Henares, Spain, 2011
- “Sustainable design for environmental equilibrium”, Zero Energy Buildings International Conference of the 10Action European Commission, Lisbon, Portugal, 2011

EXHIBITIONS

- Caixa Forum Valencia Cloud, CITY X Virtual Pavilion, 17th Venice Architecture Biennale, Italy, 2021
- Fundación Arquia exhibition, Museum of Science and Technology, La Coruna, Spain, 2013
- Innovation in Architecture, Spanish Pavilion , 11th Venice Architecture Biennale, Italy, 2012
- Post Industrial Landscapes, Sant Adria del Besos, Barcelona, Spain, 2011
- Performative Design, Färgfabriken Museum, Stockholm, Sweden, 2009

AWARDS

- CONACYT 439983 federal grant awarded by the government of Mexico, 2016
- 1st place Fundacion Arquia Competition, award by Arquia Bank, 2013
- Ministry of Education of Spain, fellowship EDU/1868/2011, 2012
- Premi Solar 2012, Renewable Energies European Association EUROSOLAR, 2012
- IP-European Programme for landscape studies, 2011

SERVICE

- Reviewer, Computer-Aided Architectural Design Research in Asia, 2019 – 2022
- Technology Consultant, National Laboratory of Sustainable Housing and Communities of Mexico, 2016 - 2022
- Journal reviewer, International Journal on Architectural Computing, 2019 - 2021
- Journal reviewer, Technology | Architecture + Design, 2021

MEMBERSHIPS

- Council of Spanish Architects, Official College of Architects of Madrid
- Member of the International Association for Shell and Spatial Structures

LANGUAGES

- Spanish (native)
- Advanced Catalan
- Fluent in English (C2)
- Intermediate French (B1)
- Advanced Italian

SKILLS

- Scientific strategy
- Communication and intercultural competence
- Translating complex concepts
- Mentorship and leadership
- Results oriented
- Team building

SOFTWARE & TOOLS

- CAD / CAM: Rhino / Grasshopper, Autocad, Fusion 360, Sketchup
- Robotic Fabrication: Robot Studio, HAL, RoboDK
- Simulation: SimScale, ANSYS, Paraview, Karamba
- Programming and Physical computing: Python, Arduino
- Project management and collaborative tools: Microsoft Project, Revu
- Visualization and Rendering: 3Ds Max, VRay, Lumion, Endscape
- Graphic Design and Video Editing: InDesign, Illustrator, After Effects, Premiere Pro, Photoshop
- Working knowledge of Revit, Dynamo, VR applications, TEKLA