

## Curriculum Vitae

### Personal Data

Title	Dr. Ing.
First name	Jorge-Humberto
Name	Urrea-Quintero
Current position	Postdoctoral researcher
Current institution(s)/site(s), country	TU Braunschweig, Institute of Applied Mechanics (IAM), Division Data-Driven Modeling of Mechanical Systems, Germany
Identifiers/ORCID	<a href="https://orcid.org/0000-0002-7690-4298">https://orcid.org/0000-0002-7690-4298</a>

### Qualifications and Career

Stages	Periods and Details
Bachelor	<b>Control Engineering</b> , 01.2007 – 09.2013, Universidad Nacional de Colombia, Colombia.
Master	<b>Master in Engineering</b> , 01.2014 – 12.2015, Universidad de Antioquia, Colombia.
Doctorate	<b>Doctor in Chemical Engineering</b> , 01.2016 – 09.2020, <b>Supervisors:</b> Prof. Dr.-Ing. Silvia Ochoa, Prof. Dr.-Ing. Michele Marino, <b>Subject:</b> Multiscale modeling of free-radical polymerization, Universidad de Antioquia, Colombia.
<b>Stages of academic/professional career</b>	
Postdoctoral researcher	08.2023 - present, TU Braunschweig, Institute of Applied Mechanics ( <b>IAM</b> ) – Division Data-Driven Modeling of Mechanical Systems lead by <b>Prof. Henning Wessels</b>  <b>Research activities:</b> - Application of data-driven modeling methods to different solid mechanics problems. - Implementation of reduced order models (ROM) for coupled multiphysics problems. - Preparation and teaching of the data-driven material modeling (WiSe 2023/2024 and WiSe 2025/2026 ).
Postdoctoral researcher	04.2021 – 07.2023, Leibniz Universität Hannover, Institute of Mechanics and Computational Mechanics ( <b>IBNM</b> ) led by <b>Prof. Udo Nackenhorst</b>  <b>Research activities:</b> - Development of a multiphysics model of hydrogels diffusion-deformation. - Different collaborations in Uncertainty Quantification and Bayesian statistics. - Preparation and teaching of the courses Mechanics of Solids (winter semester 2021/2022 and 2022/2023) and Stochastic Finite Elements (summer semesters 2021/2022/2023).
Research Assistant	10.2020 – 03.2021, Leibniz Universität Hannover, Institute of Continuum Mechanics ( <b>IKM</b> ) led by <b>Prof. Peter Wriggers</b>  <b>Research activities:</b> <b>Contribution to the project:</b> Modeling of the time-dependent gelation process of Ca-alginate gels made by external gelation method led by <b>Prof. Peter Wriggers</b> and <b>Prof. Michele Marino</b>

### Activities in the Research System

- 2026** Co-organizer of GAMM AG Data workshop held at TU Braunschweig  
**2025** Member of organizing committee of GACM colloquium held at TU Braunschweig  
**2025** Co-organizer of invited session at SIM-AM 2025 / 60 session attendees / Italy

### Collaboration with PhD Students

- 2024 - present** SEMOTI's project founded by the Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz (BMUV). Collaboration with two doctoral researchers on surrogate modeling for deep geological repositories; co-authored a journal paper with a doctoral researcher as first author.
- 2025- present** Collaboration with Andrea Morini on experimental validation of the model discovery framework.
- 2024 - 2025** Collaboration with David Anton on uncertainty quantification in model discovery via model distillation; co-authored two CMAME journal papers.
- 2024 - 2025** Collaboration with Vahab Narouie on constitutive model discovery from sparse and noisy data; co-authored one CMAME journal paper.

### Scientific Results

#### Articles in peer-reviewed journals, contributions to peer-reviewed conferences or to anthology volumes, and book publications

Narouie, V. K., **Urrea-Quintero**, J. H., Cirak, F., & Wessels, H. (2026). Unsupervised Constitutive Model Discovery from Sparse and Noisy Data. *Computer Methods in Applied Mechanics and Engineering*, 452, 118722. DOI: <https://doi.org/10.1016/j.cma.2025.118722>

**Urrea-Quintero**, J. H., Anton, D., De Lorenzis, L., & Wessels, H. (2026). Automated constitutive model discovery by pairing sparse regression algorithms with model selection criteria. *Computer Methods in Applied Mechanics and Engineering*, 449, 118551. DOI: <https://doi.org/10.1016/j.cma.2025.118551>

Paul, L., **Urrea-Quintero**, J. H., Fiaz, U., Hussein, A., Yaghi, H., Stahlmann, J., ... & Wessels, H. (2025). Gaussian processes enabled model calibration in the context of deep geological disposal. *Data-Centric Engineering*, 6, e26. DOI: <https://doi.org/10.1017/dce.2025.17>

Agarwal, G., **Urrea-Quintero**, J. H., Wessels, H., & Wick, T. (2024). Parameter identification and uncertainty propagation of hydrogel coupled diffusion-deformation using POD-based reduced-order modeling. *Computational Mechanics*, 1-31. DOI: <https://doi.org/10.1007/s00466-024-02517-w>.

**Urrea-Quintero**, J. H., Marino, M., Wick, T., & Nackenhorst, U. (2024). A comparative analysis of transient finite-strain coupled diffusion-deformation theories for hydrogels. *Archives of Computational Methods in Engineering*, 1-34. DOI: <https://doi.org/10.1007/s11831-024-10101-x>.

Basmaji, A. A., Fau, A., **Urrea-Quintero**, J. H., Dannert, M. M., Voelsen, E., & Nackenhorst, U. (2022). Anisotropic multi-element polynomial chaos expansion for high-dimensional non-linear structural problems. *Probabilistic Engineering Mechanics*, 70, 103366.

**Urrea-Quintero**, J. H., Fuhg, J. N., Marino, M., & Fau, A. (2021). PI/PID controller stabilizing sets of uncertain nonlinear systems: an efficient surrogate model-based approach. *Nonlinear Dynamics*, 105(1), 277-299. DOI: <https://doi.org/10.1007/s11071-021-06431-1>

**Urrea-Quintero**, J. H., Marino, M., Hernández, H., & Ochoa, S. (2020). Multiscale modeling of a free-radical semibatch emulsion polymerization process: Numerical approximation by the Finite Element Method. *Computers & Chemical Engineering*, 106833. DOI: 10.1016/j.compchemeng.2020.106974.

**Urrea-Quintero**, J. H., Ochoa, S., & Hernández, H. (2019). A reduced-order multiscale model of a free-radical semibatch emulsion polymerization process. *Computers & Chemical Engineering*, 127, 11-24. DOI: 10.1016/j.compchemeng.2019.04.029.

**Academic Distinctions**

- 2020** Award for an Outstanding Performance and Collaboration of a Visiting Research - Faculty of Mechanical Engineering – Leibniz Universität Hannover – Germany.
- 2016 - 2019** Scholarship for Doctoral studies - COLCIENCIAS - grant 727/2015 - Colombian Government.
- 2014 - 2015** 'Estudiante Instructor' Scholarship (merit award) during M.Eng. studies, Universidad de Antioquia, Colombia.
- 2013** Undergraduate Research Award, Antioquia Government, Colombia.