Juan Miguel Navarro Carranza

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Software Engineer at Google

Ph.D. from Stanford University experienced in **AI/ML, large language model (LLM) evaluation, high-performance computing (HPC), and large-scale data systems**. Interests include **agentic AI frameworks, LLMs, reinforcement learning, graph machine learning, and probabilistic risk modeling**, with a focus on bridging cutting-edge AI with real-world engineering and data challenges. Recent work includes a **NeurIPS 2025 paper and oral presentation on LLM robustness under paraphrase stress tests**.

Experience

Google 2026-10 – Present

Software Engineer

- Software engineering at Google.

Daice Labs 2026-03 – 2026-09

AI Research Engineer Boston, U.S.

- Designing hybrid AI systems that integrate foundation models with neurosymbolic reasoning and biologically inspired computational principles. Developing robustness evaluation and governance tooling to audit system behavior under contextual variation, and collaborating across engineering and product teams to translate research prototypes into scalable, production-ready AI solutions.
- Prototyping hybrid composite AI architectures that combine foundation models with neurosymbolic components and bio-inspired system design for adaptive, auditable workflows.
- Developing evaluation and governance-minded tooling to stress-test hybrid systems under changing context and to support traceable, explainable decision-making.
- Collaborating across engineering and product teams to translate research findings into production-ready AI solutions.

Stanford University 2019 – 2025

Graduate Researcher Stanford, U.S.

- **Developed and published a reproducible evaluation protocol** (NeurIPS 2025 Workshop) measuring **surface-form robustness of LLMs** via paraphrase stress tests, using Mistral-7B and Qwen2.5-7B with deterministic 4-bit inference on NVIDIA A100.
- Designed and implemented large-scale **HPC pipelines** for nonlinear dynamic simulations of reinforced concrete buildings, scaling to hundreds of thousands of earthquake simulations on Stanford's Sherlock cluster.
- Built a modular **Python data ecosystem** integrating **DuckDB (relational metadata)** and **HDF5 (time-series arrays)**, enabling fast querying and analysis of multi-terabyte structural simulation datasets.
- Parametric calibration of the Reinforcement Ductile Fracture Model (RDFM), **integrating mechanics and ML** to predict reinforcement fracture under low-cycle fatigue of reinforced concrete shear walls; validated with 23 laboratory experiments.
- Applied **machine learning methods** (Bayesian inference, probabilistic risk modeling) to quantify collapse fragility, resilience metrics, and post-earthquake degradation of building systems.
- Produced **visualization and analytics tools** (Matplotlib, Jupyter, HPC logging) for real-time monitoring and reproducibility of simulations across thousands of jobs.

Stanford University 2023 – 2023
Teaching Assistant, CEE 280 Advanced Structural Analysis Stanford, U.S.

- Mentored students in **object-oriented software design** for structural analysis engines, guiding projects from architecture to implementation.
- Led tutorials on **structural analysis methods and programming skills**, increasing student performance and engagement.
- Provided detailed feedback on code and analysis workflows, reinforcing best practices in **version control, modularity, and reproducibility.**

Balderrama & Silos Ingeniería Estructural, S.C. 2016 – 2019
Structural Engineer Guadalajara, Mexico

- Co-led structural design of a **$500M industrial facility** and multiple commercial/residential projects, delivering structural systems from analysis through construction.
- Developed **custom algorithms and automation tools** for analysis/design of structural elements, improving team efficiency and reducing manual calculation time.
- **Directed** a team on the design of a 5-story residential building in Mexico City and the data center building for Megacable in Guadalajara, Mexico.
- Managed structural project workflows, coordinating engineers to ensure delivery under tight deadlines.

Education

Stanford University 2019 – 2025
Ph.D. in Structural Engineering; doctoral training in Computer Science

Stanford University 2019 – 2021
M.S. in Structural Engineering

Universidad de Guadalajara 2011 – 2016
B.S. in Civil and Environmental Engineering; GPA: 97.38/100; Summa Cum Laude

Institut National des Sciences Appliquées de Lyon (INSA de Lyon) 2014 – 2015
Study abroad program in Civil Engineering and Urban Planning

Publications

- **J. M. Navarro Carranza**. **LLMs Show Surface-Form Brittleness Under Paraphrase Stress Tests**. NeurIPS 2025 Workshop on Evaluating the Evolving LLM Lifecycle: Benchmarks, Emergent Abilities, and Scaling. 2025. (Workshop Paper). [**Oral**]. DOI: 10.48550/arXiv.2510.08616.
- **J. M. Navarro Carranza**. Effects and implications of longitudinal reinforcing steel bar fracture due to low-cycle fatigue on reinforced concrete shear walls performance and post-earthquake safety. Stanford University. 2025. (Ph.D. Dissertation). URL: purl.stanford.edu/my842vn0510.
- **J. M. Navarro Carranza**, G. G. Deierlein, K. Zhong. Simulation of Longitudinal Reinforcing Steel Bar Fracture in Reinforced Concrete Walls. Bulletin of Earthquake Engineering, 23(1), 517–551. 2025. (Journal Article). DOI: 10.1007/s10518-024-02078-6.
- **J. M. Navarro Carranza**, G. G. Deierlein, K. Zhong. The Influence of Low-Cycle Fatigue on Collapse of Concrete Shear Walls. 18th World Conference on Earthquake Engineering, Milan, Italy. 2024. (Conference Paper). [**Oral**].
- E. Miranda, A. Acosta Vera, L. Aponte-Bermudez, J. Archbold, M. Cortés, A. Du, S. Gunay, W. Hassan, P. Heresi, A. C. Lamela, A. Messina, S. Miranda, **J. M. Navarro Carranza**, J. Padgett, A. Poulos, G. Scagliotti, A. Tsai, T. Kijewski-Correa, I. Robertson, K. Mosalam, D. Prevatt, D. Roueche. StEER-07 Jan. 2020 Puerto Rico Mw6.4 Earthquake: preliminary virtual reconnaissance report (PVRR). StEER. 2020. (Technical Report). DOI: 10.17603/ds2-xfhz-fz88.

Skills

- **AI & Machine Learning:** PyTorch, TensorFlow, Scikit-learn, Graph ML, Bayesian Inference, Probabilistic Modeling, LLMs, Agentic AI, Retrieval-Augmented Generation (RAG), Vector databases.
- **Agentic & Orchestration Frameworks:** ADK, LangChain, LangGraph-style workflows, Multi-step reasoning pipelines, Tool-augmented LLM systems.
- **Data Engineering & Databases:** SQL, AWS (S3, EC2), HPC job scheduling (SLURM), DuckDB, HDF5, Data pipeline design.
- **Software Development:** Object-Oriented Programming (OOP), Git, Docker, REST APIs, CI/CD, FastAPI.
- **High-Performance Computing:** Parallel processing (multiprocessing, MPI concepts), Cluster workflows, Scalable data handling (multi-TB datasets).
- **Programming:** Python, SQL, C++, LaTeX, MATLAB, TCL, Bash.
- **Languages:** English (Bilingual), Spanish (Native), French (Full professional, DELF B2).

Relevant Coursework

Stanford University: CS221 Artificial Intelligence: Principles and Techniques - **CS230** Deep Learning - **CS229** Machine Learning - **CS224W** Machine Learning with Graphs - **CS205L** Continuous Mathematical Methods with an Emphasis on Machine Learning - **CS231N** Deep Learning for Computer Vision – **AWS:** Generative AI with LLMs

Academic Achievements

Top Reviewer 2026
Conference on Neural Information Processing Systems (NeurIPS).

Best Reviewer Award 2025
NeurIPS 2025 Workshop on Evaluating the Evolving LLM Lifecycle.

John A. Blume Fellowship 2022-2025
School of Engineering, Stanford University.

Gere Award 2022-2023
School of Engineering, Stanford University.

The Shah Family Fund Fellowship 2021-2022
School of Engineering, Stanford University.

Nancy Grant Chamberlain Fellowship 2021-2022
School of Engineering, Civil and Environmental Engineering, Stanford University.

Dionisio Garza-Medina Fellowship 2020-2021
School of Engineering, Stanford University.

Nancy Grant Chamberlain Fellowship 2019-2020
School of Engineering, Civil and Environmental Engineering, Stanford University.

Claudio X. González Fellowship 2019-2020
School of Engineering, Stanford University.

Fulbright-García Robles Scholarship 2019-2022
U.S.-Mexico Commission for Educational & Cultural Exchange (COMEXUS).

Distinguished Academic Performance Award 2017
Ceremonia de Reconocimiento a Estudiantes Sobresalientes, CRES 53rd Ed., Universidad de Guadalajara.

Academic Excellence Award 2017
Colegio Metropolitano de Ingenieros Civiles de Jalisco, A.C., COMICIJ.

México Francia Ingenieros Tecnología (MEXFITEC) Fellowship 2014-2015
Secretaría de Educación Pública, SEP.

Programa de Estímulos Económicos a Estudiantes Sobresalientes (PEEES) 2013,2014,2016
Universidad de Guadalajara. Scholarship for high academic performance.

Excellence Scholarship 2014
Secretaría de Educación Pública, SEP. Stipend awarded to high academic performance students.

TELMEX Scholarship 2014
TELMEX. Stipend awarded to high academic performance students.

Talks and Conferences

1. **NeurIPS 2025 Workshop on Evaluating the Evolving LLM Lifecycle: Benchmarks, Emergent Abilities, and Scaling** - "LLMs Show Surface-Form Brittleness Under Paraphrase Stress Tests" [**Oral**]. San Diego, U.S., 2025.
2. **Stanford University** - Blume Center 50th Anniversary Celebration, "Simulation of Longitudinal Reinforcing Steel Bar Fracture in Reinforced Concrete Walls" [**Poster**]. Stanford, U.S., 2025.
3. **18th World Conference on Earthquake Engineering**, "The Influence of Low-Cycle Fatigue on Collapse of Concrete Shear Walls" [**Oral**]. Milano, Italy, 2024.
4. **Texas Advanced Computing Center (TACC)** - NHERI 2022 SimCenter Symposium, "Modeling and Implications of Reinforcing Bar Fracture Due To Low-Cycle Fatigue In Reinforced Concrete Walls" [**Poster**]. Austin, U.S., 2022.
5. **Stanford University** - Blume Center and SURI Affiliates and Alumni Meeting, "Modeling and Implications of Reinforcing Bar Fracture Due To Low-Cycle Fatigue In Reinforced Concrete Walls" [**Poster**]. Stanford, U.S., 2022.
6. **Berkeley/Stanford** - Computational Mechanics Festival (CompFest), "Modeling and Implications of Reinforcing Bar Fracture Due To Low-Cycle Fatigue In Reinforced Concrete Walls" [**Oral**]. Stanford, U.S., 2022.

Service

1. Member:
    - 2023 Fulbright Selection Committee.
2. Reviewer:
    - International Conference on Learning Representations (ICLR), 2025.
    - International Conference on Artificial Intelligence and Statistics (AISTATS), 2025.
    - Conference on Neural Information Processing Systems (NeurIPS), 2024, 2025, 2026 [**Top Reviewer**].
    - Conference on Language Modeling (COLM), 2026.
    - NeurIPS LLM Evaluation Workshop, 2025 [**Best Reviewer Award**].
    - NeurIPS UniReps: Unifying Representations in Neural Models, 2023, 2024, 2025.
    - NeurIPS NeurReps: Symmetry and Geometry in Neural Representations, 2026.
    - NeurIPS NeuralArtifacts: Neural Network Artifacts as a New Data Modality, 2026.
    - ICML Workshop on Theoretical Foundations of Foundation Models (TF2M), 2024.

- ICML Workshop LXAI, 2023.
- ICML Workshop on Neural Compression: From Information Theory to Applications, 2023.
- ICLR Workshop on Sparsity in LLMs (SLLM), 2025.
- COLM Workshop AI Measurement Science: Toward Rigorous AI Evaluation, 2026.
- Nations of the Americas Chapter of the Association for Computational Linguistics (NAACL) LatinX in Natural Language Processing Research Workshop, 2024.
- Journal of LatinX in AI Research (JLXAI).
- LatinX in AI Supercomputing Network Cohort II (LXAISN), 2024.

Academic Activities and Certifications

Generative AI with Large Language Models 2023
Amazon Web Services, Coursera.

Deep Learning Specialization 2022
DeepLearning.AI, Coursera.

Project Supervisor Seminar. Project management and supervision training. 2016-2017
Colegio de Ingenieros Civiles del Estado de Jalisco (CICEJ), Guadalajara, Mexico.

Making Space Affordable to All Countries 2016
67th International Astronautical Congress (IAC), Guadalajara, Mexico.

Insighter: User-Centered Design 2016
The Innovation Factor Plus, Guadalajara, Mexico.

Campus Party 2016
Technology, innovation and entrepreneurship conference, Guadalajara, Mexico.

Language, Communication and French Culture Training, Level B2 2014
Centre d'Approches Vivantes des Langues et des Medias, CAVILAM-Alliance française, Vichy, France.

French Language 2014
French Institute Alliance Française, Guadalajara, Jalisco

Basic AutoCAD 2013 2014
CAD Soluciones (CAD Center), Guadalajara, Jalisco

Transforming Leadership Regional Program, Leadership and coaching training 2014
Jalisco Government, Guadalajara, Jalisco