FACUNDO TOMÁS LEGUIZAMÓN PFEFFER

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Honors civil engineer pursuing a M.S. in structural engineering at UC Berkeley. Research experience includes the development of concrete section analysis software and nonlinear imperfection sensibility studies on shell elements. Experienced as a civil structural consultant for U.S. and Argentinian firms, and as computer scientist at Connectist (U.S) as the data-engineering R&D Manager.

EDUCATION

Master of Science, Structural Engineering.   Graduation Date: May 2026
University of California, Berkeley.
- [Homework assignments Codebook]

Bachelor of Science, Civil Engineering.   Graduation Date: September 2024
National University of Rosario (UNR), Argentina.   Final GPA: 9.20/10.00
- Highest GPA´s Honor. Engineering School's 2024 valedictorian.   (Officially converted to 3.96 /4.00 by WES)
- Relevant coursework: Earthquake Engineering, Bridge Design,
  Prestressed Concrete Design.

Associate of Science, Construction Management.   Graduation Date: December 2019
National University of Rosario (UNR), Argentina.   Final GPA: 9.00/10.00
- Highest GPA´s Honor

RESEARCH EXPERIENCE

Research Assistant   2022-Present
Institute of Applied Mechanics & Structures (IMAE)   Rosario, AR

Project #I. ACSAHE: Automated Strength Determination of Arbitrary Sections of Structural Concrete

Independently created and developed an open-source Python application that generates interaction diagrams of combined axial-force/biaxial-bending for reinforced and prestressed concrete sections under ACI 318-19(22)'s Chapter 22 hypothesis.

- **Recognized as the best undergraduate civil engineering project in LATAM and best structural engineering project in Argentina.** Refer to the HONORS section for details.
- It is adopted in universities' coursework and companies' toolsets across Latin American countries.
- It enables biaxial bending strength calculations for prestressed sections, surpassing commercial software capabilities.
- Software website for further information and solved examples: https://facundo-pfeffer.github.io/ACSAHE.github.io/.

Project #II. Non-Linear Analysis and Structural Optimization of a Large Welded Oil Tank   .

Analyzed the geometrically nonlinear buckling behavior and the imperfection sensibility of the dome roof plate of a 50 m diameter, 17.5 m high welded oil storage tank. Designed the procedure to capture imperfection sensitivity through increasing model complexity: (i) linear buckling with a geometrically nonlinear initial step, (ii) nonlinear displacement-controlled analysis, (iii) nonlinear force-control analysis and (iv) nonlinear displacement-controlled analysis.

- Modeled the structure in COMSOL Multiphysics using 2M triangular shell finite elements. The Mixed Interpolation of Tensorial Components (MITC) was not implemented in the element formulation to account for localized strain maximum.
- Performed imperfection analyses sensibility tests by scaling both localized and non-localized linear buckling mode shapes.
- Instructed new team members in the usage of COMSOL and the meticulous handling of nonlinear models.

RELEVANT WORK EXPERIENCE

Private Structural Consultant   2024-2025
Freelance   Remotely (U.S.)

Provided structural analysis and structural design consulting services to companies in the U.S. and Argentina.

- ***(Collaboration for VictoryBridge; U.S.)*** Designed the slope stabilization caissons system for a three-level, 22k-square-foot hillside residential house in Los Angeles as per ACI 318-19(22) and ASCE 7-16 standards.
- ***(Collaboration for VictoryBridge; U.S.)*** Conducted structural seismic retrofitting calculations for a 6.4k-square-foot URM building in Los Angeles (LA) to adapt to LA Building Code Chapter 16 standards requirements.
- ***(Collaboration for Baque-Goñy; AR)*** Structural design and seismic analysis of the concrete precast structure as per ACI 318-19(22) and ASCE 7-22 of a 100% Self-Sustainable residential house located in Mendoza, Argentina.

Research & Development (R&D) Engineering Manager   2019-2025
Connectist (formerly *BairesDev*)   Remotely (U.S.)

Connectist is a data analytics firm dedicated to connecting businesses with potential clients worldwide through data commercialization and AI workflow services.

- Led the Data Engineering Research & Development Department. Managed the multinational team as per Scrum principles.
- Designed event-driven Python projects, cloud-based architecture in Amazon Web Services (AWS), and database systems.
- Designed and conducted technical interviews for prospective engineering managers and senior developers.

TEACHING EXPERIENCE

Python Online Teacher for Civil Engineers   2024-Present
- Mentored and assisted LATAM civil engineers who want to learn and incorporate   LATAM (remotely)
computer science in their workflow through AECODE courses.

HONORS

Best Latin American Undergraduate Civil Engineering Research Work   2024
- Selected as Argentina's sole representative for the international competition after   Panama City, Panamá.
  ACSAHE was awarded the best undergraduate research work nationally.
- ACSAHE was showcased at COLEIC 2024 in Panamá where it won first place among
  five pre-selected projects from different countries across LATAM.
- The selection was made by three distinguished judges from industry and academia and
  both the written paper, and the presentation were evaluated.

Best Argentinian Undergraduate Structural Engineering Research Work   2024
- ACSAHE was recognized best undergraduate project of 2024 in the field of structural   Buenos Aires, AR.
  engineering by the Argentinian Society of Structural Engineers (AIE).

Highest GPA at the Engineering School (2024) – School's Valedictorian Honor 2024
- Achieved the highest GPA among all 2024 graduates across undergraduate programs   National University of Rosario, AR.
  in the Engineering School. Recognized by the Engineering School at UNR.

Fulbright Alumni   2021
- Granted Friends of Fulbright scholarship by the Fulbright Commission in Argentina.   University of Alabama, U.S.
- Took graduate structural engineering classes at the University of Alabama.

50th International Physics Olympiad (IPhO) Argentinian Competitor   2019
- Selected as Argentina's representative for the international competition in Tel Aviv,   University of Tel Aviv, Israel.
  after winning first place in the National Physics Olympiad among 100 students.
- Met with and discussed fundraising efforts with the President of Argentina, Mauricio
  Macri, to secure funding for the Argentinian team's participation in the competition.

Highest GPA in the Construction Management Class (2018)   2018
- Achieved the highest GPA among all 2018 graduates with an Associate of Science   National University of Rosario, AR.
  degree in Construction Management in Argentina. Honored by the Argentinian
  Society of Construction (CAMARCO).

Bronze medal in the National Astronomy Olympiad   2018
- Awarded third place, chosen from among one hundred pre-selected students   University of Córdoba, Argentina
  representing various cities across Argentina.

PRESENTATIONS

(I) ACSAHE: Automated Strength Determination of Arbitrary Sections of Structural Concrete
- *(Invited; opening keynote)* 6th *Paraguayan Congress of Civil Engineering (CONEIC 2024)*–Asunción, Paraguay. [Video link]
- *(AR's competitor)* 19th *Latin-American Congress of Civil Engineering (COLEIC 2024)* – Panama City, Panamá. [Video link]
- *(Invited)* 30th *Young Researchers Conference (JJI 2023)* – Asunción, Paraguay.
- *(Invited; keynote)* 15th *National Congress of Civil Engineering Students (CONEIC 2023)* – Córdoba, Argentina. [Video link]

(II) Non-Linear Analysis and Structural Optimization of a Large Welded Oil Tank
- *(Invited; opening keynote)* 6th *Paraguayan Congress of Civil Engineering (CONEIC 2024)*–Asunción, Paraguay. [Video link]
- *(Invited)* 40th *Argentine Congress on Computational Mechanics (MECOM 2024)*–Rosario, Argentina.

- *(Invited)* 1st Argentinian-Uruguayan Congress on Computational Mechanics (*MECOM 2023*)–Salto, Uruguay.
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PUBLICATIONS

- Leguizamón Pfeffer, F., Fideleff, H. N., & Möller, O. (2024). **Structural optimization of the self-supporting dome roof of large welded oil tanks**. *40th Computational Mechanics (MECOM 2024) Journal*. Argentina. [Link].
- Leguizamón Pfeffer, F., Fideleff, H. N., & Möller, O. (2024). **Influence of geometric nonlinearity in the shell buckling of large welded oil tanks**. *40th Computational Mechanics (MECOM 2024) Journal*. Argentina. [Link].
- Leguizamón Pfeffer, F., & Möller, O. (2023). **ACSAHE: Automated strength determination of arbitrary sections of structural concrete**. *Young Researchers Congress Journal (JJI 2023)*. Paraguay | Uruguay. [Link].

ACADEMIC SERVICE

Civil Engineering Student Representative.   2023-Present
                                                                          Rosario, AR.
- Elected representative for the National Association of Civil Engineering Students, advocating for the interests, concerns, and viewpoints of fellow students, as chosen through a student body vote on the National University of Rosario (UNR).

Student Representative in the Evaluation Committee   2023-Present
                                                                          Rosario, AR.
- In Argentinian national public universities, professors need to be elected to be part of the faculty staff. The evaluation committee consists of two professors and one honors student, which represents the interests of this group. Participated in evaluations #1831, #1775, #1862 y #1968 at the National University of Rosario.

VOLUNTEER WORK

Executive Board Member   2023-Present
US Alumni Group Rosario   Rosario, AR.
- Elected as a U.S. State Alumni. Organization and active participation in volunteer services, encouraging fellow alumni to join the network, in light of strengthening the bonds between the nations.

Volunteer   2022-2023
US Alumni Group Rosario   Rosario, AR.
- Volunteer U.S. State Alumni. Active participation in activities such as promoting U.S. scholarships, collaborating with different NGOs, organizing food drives, etc.
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SKILLS

Languages
Spanish (Native), English (Proficient, CEFR C1, TOEFL 111/120) and German (Intermediate, CEFR A2).

Structural design & analysis software
STAAD Pro (Proficient), COMSOL Multiphysics (Proficient), ENERCALC (Proficient), OpenSees/Xara (Intermediate).

Programming languages
Python (Proficient), C (Intermediate), C++ (Intermediate), VBA (Intermediate).

Data analysis tools & technologies
Amazon Web Services (Proficient), Excel (Proficient), PostgreSQL (Proficient), SQL Database (Proficient) & Machine Learning (Intermediate).

Design and rendering software
AUTODESK AutoCAD (Proficient), Revit (Proficient) and Lumion (Proficient).

REFERENCES

Oscar Möller, Ph.D.   moller@fceia.unr.edu.ar
Research Supervisor at IMAE.
Nicolas Pintos Barreto, Eng.   nicolas.pintos@connectist.com
Manager Director at Connectist and BairesDev.
Yolanda Galassi, MS.   ygalassi@fceia.unr.edu.ar
Vice Dean of the Engineering School of the National University of Rosario.