

## CURRICULUM VITAE

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### EDUCATION

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- Aug. 2012 – Aug. 2018**      **ETH Zurich**, Swiss Federal Institute of Technology, Zurich (CH)  
PhD in the group of “Physical Chemistry of Building Materials”
- Aug. 2010 – Dec. 2011**      **University of California, Berkeley**; Berkeley, CA (USA)  
Master of Science; Structural Engineering, Mechanics and Materials -  
Cumulative GPA: 3.6 (out of 4.0)
- Aug. 2007 – Dec. 2009**      **University of California, Berkeley**, Berkeley, CA (USA)  
Bachelor of Science; Civil and Environmental Engineering -  
Cumulative GPA: 3.7 (out of 4.0)
- Jan. 2004 – May 2007**      **Saddleback College**, Mission Viejo, CA (USA)  
Associate degree of Engineering

### TECHNICAL SKILLS

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- Languages**                      Spanish (native), English (fluent), German (conversational)
- Operating systems**            Windows, Macintosh
- Software**                        Python, R (kernlab), Matlab, Mathematica, SketchUp, GEMS,  
Microsoft Office
- Instruments**                     $\mu$ XRF spectrometer, SEM, TGA, XRD, nano indentation
- Statistics**                        Data Science, Machine Learning, Chemometrics

### RESEARCH PROJECTS

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- Oct. 2021 – present**            “Carbon Capture and Mineralization for Concrete Alternatives”  
(LDRD project 10812), Oak Ridge National Laboratory
- Developing new cementitious material using calcium hydroxide and polymers for carbon capture for precast applications
- Oct. 2021 – present**            Assessment of irradiation susceptibility of San Onofre’s concrete formulation based on the composition of the aggregates (NRC project), Oak Ridge National Laboratory

- Assist in the characterization of aggregates using XRD, petrography,  $\mu$ -XRF, and EDS to obtain 2D mineral phase maps that can be used as input for damage simulations

**April 2021 – Sept. 2021**

“Additive Manufacturing of Carbonated Cementitious Materials” (SEED project 10619), Oak Ridge National Laboratory

- Developing new cementitious material using calcium hydroxide and polymers for carbon capture and 3D printing applications

**May 2020 – Sept. 2021**

“AMO’s Infrastructure Scale Additive Manufacturing,” MDF, Oak Ridge National Laboratory

- Developed novel carbonated cementitious printable material
- Perform compact test sample to characterize the bond strength between layers in 3D printed concrete samples
- Apply the benefits of micro XRF’s high spatial resolution on 3D printed concrete samples exposed to chloride solutions

**Aug. 2012 – Dec. 2018**

“Quantitative micro XRF mapping of chlorides: possibilities, limitations, and applications, from cement pastes to digital concrete” (Doctoral thesis, Physical Chemistry of Building Materials, ETH Zurich), supervised by Prof. Robert J. Flatt

- Developed novel method to measure and characterize chlorides in cement paste and mortars using micro XRF
- Applied Machine Learning techniques to process spectral data and quantify chlorides
- Investigated the chloride transport phenomena in cement paste and mortar samples
- Applied the benefits of a high spatial resolution on 3D printed concrete samples exposed to chloride solutions

**July 2011 – Dec. 2011**

Research project, supervised by Prof. Claudia Ostertag, University of California, Berkeley.

- Prepared and conducted expansion tests of specimens containing reactive aggregates
- Investigated the effects of coating aggregates with silica fume on ASR

**Jan. 2011 – July 2011**

Research project, supervised by Prof. Claudia Ostertag, University of California, Berkeley

- Assisted in the preparation and testing of concrete specimens
- Aided in the execution of Rapid Chloride Penetration Tests

- May 2009 – Aug. 2009**      Research project, supervised by Prof. Ayman Mosallam, University of California, Irvine
- Assisted in the testing of I-sections of Pultruded Composites for the American Society of Civil Engineers (ASCE) Structural Design Manual for Composite Joints and the ASCE Pre-standard Documents for Pultruded Composites.
  - Assisted in the manufacturing of rotation testing device

## WORK EXPERIENCES

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- May 2020 – Present**      **Oak Ridge National Laboratory, Oak Ridge, TN, USA**  
*Associate Technical Professional*
- Principal investigator of LDRD project 10812: Carbon Capture and Mineralization for Concrete Alternatives
  - Laboratory space manager of the laboratory for the preparation of cementitious materials specimens
  - Principal investigator of SEED project 10619: Additive Manufacturing of Carbonated Cementitious Materials
  - Supporting researcher for AMO's Infrastructure Scale Additive Manufacturing project in collaboration with Dr. Brian Post's research group at MDF
- May 2019 – Feb. 2020**      **Andreas Steiger & Partner AG, Lucerne, Switzerland**  
*Consulting Engineer*
- Perform non-destructive testing techniques on existing buildings to assess level of damage in reinforced concrete
  - Analyse data collected in the field
- Aug. 2012 – Apr. 2019**      **ETH Zurich, Institute for Building Materials, Physical Chemistry of Building Materials, Zurich, Switzerland**  
*Scientific Assistant (Oct. 2018 – April 2019)*
- Trained chair of microscopy in the operation of a  $\mu$ XRF spectrometer
  - Translated several chapters of the book: Aïtcin, Pierre-Claude, and Robert J. Flatt, eds. *Science and technology of concrete admixtures*. Woodhead publishing, 2015
- Teaching Assistant (Aug. 2012 – Dec. 2017)*
- Materials III: bachelor level laboratory courses for civil engineers (masonry, metals, fracture mechanics)
  - Materials I: preparation of exercises and exam questions on cement and concrete

- Concrete Material Science: master level course for civil engineers. Responsible for teaching and correcting reports for the GEMS part of the computational laboratory. (2 semesters)

*Research Supervisor (Spring 2014)*

- “Effect of fibers on mechanical properties of lightweight aggregate concrete”, Bachelor’s Thesis supervisor

**Aug. 2010 – Dec. 2011**

**University of California, Berkeley, Berkeley, CA, USA**

*Graduate Student Reader/Grader/Assistant*

Analyzed students’ mastery of engineering concepts and reported deficiencies on a weekly basis on the following subjects:

- Statics and Mechanics of Materials; Armero, F.
- Properties of Civil Engineering Materials; Ostertag, C.
- Concrete Materials and Construction; Monteiro, P.

**May 2008 – Aug. 2008**

**Fundación Solar Centroamérica, El Eje de Agua, San Marcos, Guatemala**

*Engineering Intern*

- Planned, developed, and delivered maintenance-and-operation manuals for poor communities’ water harvesting projects
- Assisted in the supervision of water harvesting and latrine projects in small, poor villages

## TRAINING COURSES

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- Women’s Alliance Council’s 2022 Virtual Women’s Leadership Workshop. Theme is Leading Authentically. March 8-9, 2022.
- Course on “*Quantitative Analysis of X-Ray Powder Diffraction Data Using Highscore Plus.*” The primary focus are the following analyses: i) Amorphous quantification, iii) Batch analysis for analysing large amounts of data, iii) Cluster analysis and PLSR (partial least squares regression) for multivariate statistical analyses of large amounts of data. Organized by Malvern Panalytical Ltd, October 2020.
- Course on “*Teaching and learning in laboratory practical classes*”, organized by the Center for University Teaching and Learning of the University of Zurich, Zurich (Switzerland), 2015
- Training Course “*ORBIS micro XRF*”, organized by EDAX support training, Mahwah, NJ (USA) 2014
- Course on “*Presentation Skills for Scientists*”, organized by ETH Zurich (Switzerland), April 2013
- Course: “*From microstructure to performance testing*”, organized by I. Casanova (UPC, Spain), K. Scrivener (EPFL, Switzerland) and Mette Geiker (NTNU, Norway), Barcelona (Spain), June 25<sup>th</sup>-27<sup>th</sup> 2012

## ORAL PRESENTATIONS

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- “Overview of ORNL activities on developing low-CO<sub>2</sub> emission building materials” *NIST workshop: Overview of ORNL activities on developing low-CO<sub>2</sub> emission building materials*, June 8<sup>th</sup>, 2022, online.
- “Additive manufacturing of carbonated materials” *Engineering Mechanics Institute conference*, May 31<sup>st</sup> – June 3<sup>rd</sup>, Baltimore, MD, USA
- “Chloride ingress through cold joints in digitally fabricated concrete revealed by micro XRF”, *1<sup>st</sup> RILEM International Conference on Concrete and Digital Fabrication*, September 9<sup>th</sup>- 12<sup>th</sup>, 2018, ETH Zurich, Switzerland
- “Novel method for the quantification of chlorides in hydrated cement paste using micro XRF and Machine Learning”, *7<sup>th</sup> Advances in Cement-Based Materials (Cements 2016)*, July 10<sup>th</sup>-13<sup>th</sup>, 2016, Northwestern University in Evanston, Illinois

## PUBLICATIONS

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### Papers in peer-reviewed international journals

- Debalina Ghosh, Paula Bran Anleu, Yann Le Pape, and Zhongguo John Ma, Effect of Interlayer Time-lapse and Workability Retention on Printed Concrete Performance, *draft, to be submitted to Cement and Concrete Research*
- Paula Bran Anleu, Yann Le Pape, Qiyi Chen, Rigoberto Advincula, Brian Post, and M. Parans Paranthaman. Carbon Capture and Mineralization for Concrete Alternatives, *draft, to be submitted to Materials Research Communications*
- Paula Bran-Anleu, Timothy Wangler, Venkatesh N. Nerella, Viktor Mechtcherine, Pavel Trtik, Robert J. Flatt. Using micro-XRF to characterize chloride ingress through cold joints in 3D printed concrete, *under revision for Materials and Structures*
- Bran-Anleu Paula C., Caruso Francesco, Wangler Timothy, Pomjakushina Ekaterina, Flatt Robert J., Standard and sample preparation for the micro XRF quantification of chlorides in hardened cement pastes, *Microchemical Journal*, **2018**, 141, 382-387.
- Suraneni, Prannoy, Bran Anleu, Paula C., Flatt, Robert J., Factors affecting the strength of structural lightweight aggregate concrete with and without fibers in the 1,200–1,600 kg/m<sup>3</sup> density range, *Materials and Structures*, **2016**, 49, 677

## AWARDED PROPOSALS, GRANTS AND SCHOLARSHIPS

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- Laboratory Directed Research & Development Program (2022). LDRD 10812 – “*Carbon Capture and Mineralization for Concrete Alternatives*” (\$ 333k)
- Laboratory Directed Research & Development Program (2021). LDRD 10812 – “*Carbon Capture and Mineralization for Concrete Alternatives*” (\$ 485k)
- The seed money program (2020). SEED 10619 – “*Additive manufacturing of carbonated cementitious materials*” (\$ 150k)

- Grant awarded by the Lombardi Engineering Foundation (2014). No. 2-70108-13 - *“Innovative measuring method for chloride transport in concrete” (CHF 25k)*
- ETH research grant awarded by ETH Zurich (2013). No. ETH-33 12-1 – *“Quantitative micro XRF mapping of chlorides: possibilities, limitations, and applications, from cement pastes to digital concrete” (CHF 150k)*
- Bechtel Scholar 2007-2008, 2008-2009

## MEMBERSHIPS

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- **ACerS**, The American Ceramics Society, Cement Division (2021 – present)
- **ACI**, The American Concrete Institute (2016 – present)
- **Rilem**, International Union of Laboratories and Experts in Construction Materials, Systems and Structures, (2017- present)
- Rilem technical comminate member of “Accelerated Mineral Carbonation For The Production Of Construction Materials,” (August 2022 – present)
- **Chi Epsilon**, American Honor Society of Civil Engineers (2008 – present)
- **Phi Theta Kappa**. International Honor Society of the Two-Year College (2005 – present)
- Society of Hispanic Professional Engineers (**SHPE**) (2007 – 2011)
- **Student Steel Bridge Competition Team**, UC Berkeley (2007 – 2009)
- American Society of Civil Engineers (**ASCE**) (2007 – 2011)

## REFERENCES

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Dr. Yann Le Pape

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Prof. Dr. Robert J. Flatt

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