

CURRICULUM VITAE

Personal Information

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Studies

- 2010-2015 PhD at the University of Leeds, UK, Civil Engineering, supervised by Prof. Ian G. Richardson and Dr. Leon Black (Graduated June 2015):
- *Relation between composition, structure and morphology in C-S-H (Calcium Silicate Hydrates)*
The project consisted in synthesizing C-S-H with varying Ca/Si ratios by several routes (mechanochemical and controlled hydration of C₃S with and without accelerators). The samples were characterized with TEM and SEM for morphology, TG and XRD for phase purity, TEM-EDS for composition, and ²⁹Si NMR to obtain information on their silicate anion structure and their silicate mean chain length. It was found that the lime concentration plays a role in defining the resulting morphology, which varies from foil-like to fibrillar with increasing lime. The use of accelerators had an impact on the silicate anion structure; samples made by hydration of C₃S in a sonicated solution were found to have shorter silicate mean chain lengths than those made with the addition of X-seed (BASF) for comparable Ca/Si ratios.
Project embedded in a Marie Curie Initial Training Network (Transcend) within the European organization Nanocem
- 2009-2010 Master in Materials Physics and Nanotechnology, Linköping University, Sweden, with the Master's thesis at the Thin Film Physics Division, supervised by Prof. Jens Birch:
- *Growth at cryogenic temperatures and structural characterization of Cr/Sc multilayer X-ray mirrors*
The project consisted in depositing single and stacked Cr/Sc multilayers onto Si (100) substrates by magnetron sputtering. The deposition chamber was adapted to cool the stage with liquid N to investigate the effects of low deposition temperature on layer amorphization. It was found that the low temperature was beneficial for growing amorphous layers, that given their thickness, would have been crystalline if grown at usual deposition temperatures (~800C). Amorphization of the layers helps reducing the roughness in the interfaces, which increases the reflectivity of the mirrors. The deposition at cryogenic temperatures presented an advantage to improve the mirror performance by surpassing the nominal period and Cr-to-bilayer thickness thresholds previously found to grow amorphous layers.
Participation in two project courses:
 - *CO_x sensor fabrication and testing*
(In collaboration with the spin-off company SenSIC AB)
 - *Magnetron sputtering growth and characterization of ZrSiN thin films*
- 2008-2009 CAP, Physics specialty (Certificate of Pedagogic Aptitud for secondary and high school in Spain), University Complutense of Madrid
- 2003-2008 Licenciado degree in Physics (Sp 5 years BS program), University Complutense of Madrid, Spain
- 2007-2008 Erasmus exchange student program, Linköping University, Sweden,
- 2001-2003 1st and 2nd years of a Licenciado degree in Fine Arts, University Complutense of Madrid, Spain
- 2000-2001 Honours in COU (University Orientation Course), School La Inmaculada-Marillac, Madrid, Spain

Work Experience

2022-current

R&D Staff Member at Oak Ridge National Laboratory

- *Continue the tasks started as an R&D Associate with some added responsibilities listed below*
- *DOE Light Water Reactor Sustainability Program:*
 - *Materials Research Pathway Deputy Path Leader*
- *LDRD: Direct Air Capture of CO₂ using MgO*
 - *Study of the influence of surface area and particle size on the carbonation potential of MgO at different relative humidities for mineral looping via carbonation and calcination*
- *NRC project related to debonding of reinforcement with irradiation:*
 - *Project Manager responsible for Monthly Letter Status Reports*

2018-2021

R&D Associate Staff Member at Oak Ridge National Laboratory

- *DOE Light Water Reactor Sustainability Program:*
 - *Characterization of Calcium silicate hydrates (main hydration phase in cement paste) pre and post-irradiation with gamma rays at doses representative to exposure levels for long term operation of in-service nuclear structures. The objective of this project is to elucidate changes at the chemical structural level and correlate them with changes in mechanical properties after irradiation to inform radiation damage predictive models for concrete. The samples are analyzed with a variety of techniques to explore their bulk and interlayer water content (TG and XRD), chemical composition and morphology (TEM-EDS and TEM), elastic and viscoelastic (creep and stress relaxation) mechanical properties (nanoindentation), and ¹H NMR and ²⁹Si NMR to explore Si nuclei and H nuclei chemical environments (NRM is done through a collaboration with UIUC).*
 - *Characterization of neutron irradiated aggregates obtained through a collaboration with Japan within the Civil Nuclear Energy Research and Development Working Group (CNWG). The objective of this project is to correlate neutron damage with mineralogy of the aggregates by studying changes in density (He pycnometry), nano and microporosity (USAXS), and loss of stiffness (UPV and RUS).*
 - *Characterization of pristine Japanese aggregates with advanced elemental composition techniques (μ-XRF and SEM-EDS) to develop 2D mineral phase maps to be used as input for radiation damage simulations.*
 - *Perform wedge splitting tests of large concrete blocks cored from Alkali-silica reaction large mock up structures.*
- *NEUP projects lead by UIUC and UCLA:*
 - *The objective of the NEUP projects is to use advance characterization techniques that can provide images with chemical or degradation information to be used as input for irradiation damage simulations, or to be compared with simulation outputs. My role is to characterize pristine and ion irradiated minerals with μ-XRF to complement other advanced methods used at the lead universities (Raman and vertical scanning interferometry).*
- *ARPA-E project lead by UCLA:*
 - *The goal of this project is to dissolve chemical precursors with the use of ultrasonics to use the resulting solutions to synthesize zeolites, that combined with polymers, can serve as alternative and greener cementitious materials. My role in this project is to characterize the unaltered and sonicated precursors via BET to correlate their surface area with dissolution rate, and precursors and synthesized zeolites with TEM and TEM-EDS to study their morphology and chemical composition with the purpose of fine tuning the synthesis process.*

- *NRC project related to debonding of reinforcement with irradiation:*
 - *The goal of this project is to study the effect of neutron irradiation on the bond properties between steel rebars and concrete. My role in this project involved pre-drying the specimens to be irradiated and creating a temperature replica that mimics the temperature profile of the irradiation capsule in the test reactor to separate the effects of temperature and irradiation.*
- *NRC project related to harvested concrete from San Onofre Nuclear Power Plant:*
 - *The objective of this project is to assess the irradiation susceptibility of San Onofre's concrete formulation based on the composition of the aggregates. My role is to characterize the mineral phases present in the samples using XRD, petrography, μ -XRF, and EDS with the purpose of combining this information to obtain 2D mineral phase maps that can be used as input for damage simulations.*
- *LDRD project related to alternative cements based on carbonated materials:*
 - *The objective of this project is to develop calcium hydroxide slurries containing polymers that are carbonated and cured at moderate temperatures. The mixes are developed to be used for 3D printing as green alternatives to traditional concrete or mortar. My role is to characterize materials cured at different conditions and containing different polymers to understand their degree of carbonation by using XRD, and their mechanical properties using nanoindentation.*
- *Perform three point bending tests of rocks:*
 - *The objective of this project is to correlate mechanical properties of rocks with the effects of various heating treatments on their pore structure. This project is in collaboration with the Geochemistry Group at ORNL. My role consists in performing fracture tests to obtain fracture energy and Young's modulus of untreated and treated rocks.*

2016-2018

Postdoc Research Associate at Oak Ridge National Laboratory, Tennessee, USA, Light Water Reactor Sustainability Program, supervised by Dr. Yann Le Pape and Dr. Thomas Rosseel:

- *DOE Light Water Reactor Sustainability Program:*
 - *Synthesis, pellet pressing, gamma irradiation, and post-irradiation characterization of Calcium silicate hydrates to understand the effect of gamma rays on their mechanical performance.*
 - *Optimize the acquisition conditions of 2D chemical composition maps of concrete and aggregates with μ -XRF to produce phase maps to be used as input for irradiation damage simulations.*
 - *Synthesize pure mineral diopside nanoparticles to perform in-situ amorphization studies at a TEM coupled with an ion-beam (In collaboration with the Geochemistry group at ORNL and with the IVEM-TANDEM facility at ANL via a Rapid turnaround proposal funded by the NSUF)*

2010-2013

Marie Curie (ITN) Research Fellow at the University of Leeds

2008-2009

Teacher of Conventional Radiology, Program for Image Technicians for hospitals, School La Inmaculada-Marillac, Madrid, Spain (2-month substitution)

2003-2008

Private teacher for English, Spanish and Mathematics (primary, secondary and high school level), Madrid, Spain

2002

Usher at Abadia Theatre, Madrid, Spain

2001

Cashier at Superdiplo S.A., Madrid, Spain

Experimental skills

Materials synthesis and fabrication

- Sol-gel synthesis of mineral nanoparticles
- Synthesis of calcium silicate hydrates via several routes
- Implementation of drying set-ups under inert atmosphere
- Deposition of multilayer metallic thin films by magnetron sputtering

Materials analysis

- TEM, SEM, EDX, XRD, XRR, TG, STA, ²⁹Si NMR, Nanoindentation, μ-XRF, BET, He pycnometry, Fracture tests, (U)SAXS
- Punctual experience: ¹H NMR relaxometry, coupled TG-FTIR-DSC, SANS

Computer Skills

Basic user knowledge: Windows, Power Point, Microsoft Word, Outlook, Internet

Experimental data: Origin, Excel, Igor Pro

Marie Curie ITN (Initial Training Network) Courses

2013	Innovation of cementitious materials, Lyon, France
2012	From Microstructure to performance testing, Barcelona, Spain
2012	Modelling Transport and Characterization Techniques in Cementitious Materials, EPFL, Lausanne, Switzerland, with a special lecture on Science outreach to the public and working with the media by Prof. Jim Al-Khalili, Theoretical Physicist and Scientist in the public media (BBC productions and commentator in other British media)
2011	Sorption and Transport in Cementitious Materials, Lund, Sweden
2011	Project Management for Research, EPFL, Lausanne, Switzerland
2011	Writing workshop and specimen preparation, EPFL, Switzerland
2011	Introduction and initiation to cementitious materials, Maastricht, Netherlands

Short term visits to other universities/institutions under the Marie Curie ITN

2014	CSGI, Florence, Italy (3 weeks) <i>Analysis of SANS data with BerSans and Irena software package for Igor Pro with Dr. E. Fratini</i>
2013	FMR II, Garching, Germany (5 days) <i>SANS experiments with Dr. E. Fratini</i>
2013	Aarhus University, iNano, Aarhus, Denmark (2 months) <i>²⁹Si MAS NMR experiments and deconvolution with Prof. J. Skibsted</i>
2012-2013	EPFL, LMC, Lausanne, Switzerland (1 month) <i>¹H NMR relaxometry and data analysis with Prof. K. L. Scrivener</i>
2012-2013	University of Bourgogne, ICB, Dijon, France (4 months) <i>Synthesis of C-S-H via the controlled hydration of C₃S with Dr. A. Nonat</i>
2012	University of Guildford, Physics department, Surrey, UK (2 weeks) <i>Introduction to the principles and basic operation of ¹H NMR relaxometry with Prof. P. J. McDonald</i>
2011	Karlsruhe Institute of Technology, Institute of Technical Chemistry, Karlsruhe, Germany (3 days) <i>Coupled TG-FTIR-DSC experiments with Dr. K. Garbev & Dr. D. Merz</i>

Publications: Peer reviewed papers

- 2022 I. Maruyama, T. Kondo, S. Sawada, P. Halodova, A. Fedorikova, T. Okhubo, K. Murakami, T. Igari, **E. Tajuelo Rodriguez**, K. Suzuki, Radiation-induced alteration of Meta-chert, *Journal of Advanced Concrete Technology*, Vol. 20, 760-776, 2022
- 2022 A. Cheniour, Y. Li, J. Sanahuja, Y. Le Pape, **E. Tajuelo Rodriguez**, L. Anovitz, K. Polavaram, N. Garg, T. M. Rosseel, FFT-Based Model for Irradiated Aggregate Microstructures in Concrete, *Materials and Structures* 55, 214 (2022)
- 2022 S. Kearney, **E. Tajuelo Rodriguez**, J. D. Arregui-Mena, S. Lawson, J. Provis, Simulation of radiation damage via alpha decay in BFS:PC grouts using 4He^{2+} ion acceleration, *Cement and Concrete Research* 159, 2022, 16895
- 2022 A. Baral, **E. Tajuelo Rodriguez**, W. A. Hunnicutt, E. Cakmak, H. Sun, J. Ilavsky, Y. Le Pape, T. M. Rosseel, N. Garg, Ultra-high gamma irradiation of calcium silicate hydrates: Impact on mechanical properties, nanostructure, and atomic environments, *Cement and Concrete Research* 158, 2022, 106855
- 2021 C. E. Torrence, A. B. Giorla, Y. Li, **E. Tajuelo Rodriguez**, J. D. Arregui Mena, T. M. Rosseel, Y. Le Pape, MOSAIC: An Effective FFT-based Numerical Method to Assess Aging Properties of Concrete, *Journal of Advanced Concrete Technology*, Vol. 19, 149-167
- 2020 Y. Li, Y. Le Pape, **E. Tajuelo Rodriguez**, C. E. Torrence, J. D. Arregui Mena, T. M. Rosseel, M. Sircar, Microstructural characterization and assessment of mechanical properties of concrete based in combined elemental analysis techniques and Fast-Fourier transform-based simulations, *Journal of Construction and Building Materials*, 257, 1195
- 2020 W. A. Hunnicutt, **E. Tajuelo Rodriguez**, Y. Le Pape, P. Mondal, Examination of gamma-irradiated C-S-H. Part II: Mechanical properties, *Journal of Advanced Concrete Technology*, Vol.18, 558-570
- 2019 **E. Tajuelo Rodriguez**, W. A. Hunnicutt, Y. Le Pape, P. Mondal, Examination of gamma-irradiated C-S-H. Part I: Chemical-structural properties, *American Ceramic Society*, 2020;103:558–568
- 2018 Facile emulsion mediated synthesis of phase pure diopside nanoparticles, **E. Tajuelo Rodriguez**, L. M. Anovitz, C. Clement, A. J. Rondinone, M. C. Cheshire, *Scientific Reports* 2018, 8:3099
- 2017 **E. Tajuelo Rodriguez**, I. G. Richardson, L. Black, D. Merz, K. Garbev, Thermal stability of C-S-H phases and applicability of Richardson and Groves' and Richardson C-(A)-S-H(I) models to synthetic C-S-H, *Cement and Concrete Research* 93, 2017, pages 45-56
- 2015 **E. Tajuelo Rodriguez**, I. G. Richardson, L. Black, E. Boehm-Courjault, A. Nonat, J. Skibsted, Composition, silicate anion structure, and morphology of calcium silicate hydrates (C-S-H) synthesised by silica-lime reaction and by the controlled hydration of tricalcium silicate (C_3S), *Advances in Applied Ceramics*, Volume 114, 2015, Issue 7: *Cement and Concrete Science*

Publications: Conference Presentations, Proceedings and Transactions

- 2022 **E. Tajuelo Rodriguez**, L. M. Anovitz, M. Cheshire, Y. Le Pape, J. Ilavsky, T. Rosseel, Assessment of Neutron-Irradiation Damage in Aggregats, *presentation with paper*, *20th International Conference on Environmental Degradation of Materials in Nuclear Power Systems – Water Reactors*, Snowmass Village, CO, July 17th- 21st, 2022
- 2022 A Cheniour, Y. Li, **E. Tajuelo Rodriguez**, S. C. Henderson, Y. Le Pape, J. D. Arregui Mena, T. Rosseel, A Novel Approach To Simulate Realistic Concrete Microstructures Under Irradiation, *presentation with paper*, *20th International Conference on Environmental Degradation of Materials in Nuclear Power Systems – Water Reactors*, Snowmas Village, CO, July 17th- 21st, 2022 (Presented by A. Cheniour)
- 2022 K. Polavaram, **E. Tajuelo Rodriguez**, A. Cheniour, Y. Le Pape, N. Garg, Raman Imaging For High-Resolution Mineral Mapping Of Granite, *presentation with paper*, *20th International Conference on Environmental Degradation of Materials in Nuclear Power Systems – Water Reactors*, Snowmass Village, CO, July 17th- 21st, 2022 (Presented by K. Polavaram)
- 2022 Y. Le Pape, **E. Tajuelo Rodriguez**, A. Cheniour, M. Alnaggar, P. Bran Anleu, T. Rosseel, D. Arregui Mena, A. Brooks, Life Betond 80: Can Concrete Degradation Synergistic Modes Become Showstoppers for Light Water Reactors?, *presentation with paper*, *20th International Conference on Environmental Degradation of Materials in Nuclear Power Systems – Water Reactors*, Snowmass Village, CO, July 17th- 21st, 2022 (Presented by Y. Le Pape)
- 2022 T. M. Rosseel, X. Cheng, **E. Tajuelo Rodriguez**, M. Sokolov, M. Gussev, Y. Le Pape, LWR Aging Management for Life Beyond 80, *presentation with paper*, *20th International Conference on Environmental Degradation of Materials in Nuclear Power Systems – Water Reactors*, Snowmass Village, CO, July 17th- 21st, 2022 (Presented by T. M. Rosseel)
- 2022 **E. Tajuelo Rodriguez**, W. Hunnicutt, A. Baral, N. Garg, D. Arregui Mena, P. Mondal, L. Anovitz, H. Sun, E. Cakmak, M. Cheshire, J. Ilavsky, Y. Le Pape, T. Rosseel, Irradiation impact in concrete: Gamma effects on cement paste constituents (calcium silicate hydrates) and neutron effects on minerals present in aggregates, *presentation*, *Goldschmidt*, Honolulu, HI, July 10th- 15th, 2022
- 2022 **E. Tajuelo Rodriguez**, W. Hunnicutt, A. Baral, N. Garg, D. Arregui Mena, P. Mondal, L. Anovitz, H. Sun, E. Cakmak, M. Cheshire, J. Ilavsky, Y. Le Pape, T. Rosseel, What does irradiation do to concrete? Insights on effects at the paste and aggregate levels, *opening session presentation*, *Engineering Mechanics Institute Conference*, Johns Hopkins University, Baltimore, MD, May 31st- June 3rd, 2022
- 2021 Y. Li, Y. Le Pape, A. Cheniour, **E. Tajuelo Rodriguez**, T. M. Rosseel, Study on creep in irradiated concrete based on combined elemental analysis techniques and Fast-Fourier transform-based simulations, *presentation with video*, *Biot-Bazant Conference on Engineering Mechanics and Physics of Porous Materials and Structures*, June 1st-3rd, 2021 (Presented by Y. Li)
- 2019 **E. Tajuelo Rodriguez**, Y. Le Pape, T. Rosseel, W. A. Hunnicutt, A. Baral, N. Garg, Effect of gamma irradiation on creep properties of cement paste analogues, *presentation with paper*, *19th International Conference on Environmental Degradation of Materials in Nuclear Power Systems – Water Reactors*, Boston, MA, August 18th- 22nd, 2019

- 2019 J. D. Arregui Mena, A. B. Giorla, G. E. Jellison, **E. Tajuelo Rodriguez**, C. E. Torrence, M. Kawai, Y. Le Pape, T. M. Rosseel, Irradiation effects on reactor concrete structures, *poster presentation with paper, 148th TMS Annual Meeting and Exhibition*, San Antonio, March 10th-14th, 2019 (Presented by J. D. Arregui Mena)
- 2019 Y. Le Pape, **E. Tajuelo Rodriguez**, J. D. Arregui Mena, A. Giorla, L. Anovitz, T. M. Rosseel, Neutron-Irradiation Induced damage assessment in concrete using combined phase characterization and nonlinear FFT simulation, *presentation with paper, 10th International Conference on Fracture Mechanics of Concrete and Concrete Structures, FramCoS-X*, Bayonne, France, June 24th-26th, 2019 (presented by Y. Le Pape)
- 2019 **E. Tajuelo Rodriguez**, W. A. Hunnicutt, A. Baral, N. Garg, Y. Le Pape, Evaluation of gamma irradiation damage in C-S-H, *presentation, 10th Advances in Cement-based Materials meeting from the American Ceramic Society*, University of Illinois at Urbana-Champaign, June 16th-18th, 2019
- 2018 **E. Tajuelo Rodriguez**, W. A. Hunnicutt, P. Mondal, Y. Le Pape, Elastic, Viscous and Creep response of Gamma irradiated C-S-H, *presentation with paper, Triennial international symposium of Nanotechnology in construction*, Hong Kong, December 2nd-5th, 2018
- 2018 J. D. Arregui Mena, A. B. Giorla, G. E. Jellison, **E. Tajuelo Rodriguez**, C. E. Torrence, Yann Le Pape, T. M. Rosseel, Microstructural modelling of irradiated LWR concrete with MOSAIC, *presentation with paper, Numat Conference*, Seattle, October 14th-18th, 2018, (Presented by J. D.)
- 2018 **E. Tajuelo Rodriguez**, W. A. Hunnicutt, P. Mondal, Y. Le Pape, Assessing the effects of gamma irradiation in concrete, *presentation with paper, American Nuclear Society Transactions for the Embedded topical meeting: Nuclear fuels and structural materials for next generation nuclear reactors*, Philadelphia, June 17th -22nd, 2018
- 2018 T. M. Rosseel, A. B. Giorla, M. N. Gussev, G. E. Jellison, Y. Le Pape, I. Remec, C. Silva, **E. Tajuelo Rodriguez**, S. M. Curlin, L. F. Mora, Assessing the effects of irradiation on reactor cavity concrete, *presentation with paper, American Nuclear Society Transactions for the Embedded topical meeting: Nuclear fuels and structural materials for next generation nuclear reactors*, Philadelphia, June 17th -22nd, 2018
- 2017 **E. Tajuelo Rodriguez**, W. A. Hunnicutt, Y. Le Pape, P. Mondal, Viscous behaviour of gamma irradiated C-S-H, *presentation with paper, Proceedings of the 37th Cement and Concrete Science Conference*, London, September 11th -12th, 2017, p. 63-66
- 2017 **E. Tajuelo Rodriguez**, W. A. Hunnicutt, Y. Le Pape, P. Mondal, Viscoelastic properties of gamma-irradiated calcium silicate hydrates (*only presentation*), *253rd National Meeting of the American Chemical Society*, San Francisco, April 2nd-6th
- 2014 **E. Tajuelo Rodriguez**, I. G. Richardson, L. Black, A. Nonat, J. Skibsted, E. Boehm-Courjault, Chemical structure and morphology of C-S-H synthesized by silica-lime reaction and by the controlled hydration of C₃S, *presentation with paper, Proceedings of Cement and Concrete Science Conference*, September 15th-16th, 2014, University of Sheffield, p. 109-112
- 2013 **E. Tajuelo**, I. G. Richardson, L. Black, J. Skibsted, A. Nonat, Comparison of morphology and chemical structure of C-S-H synthesized by silica-lime reaction and by the controlled hydration of C₃S, *presentation with paper, Proceedings of Transcend Final Conference*, November 4th-6th, 2013, Guildford, UK, pages 89-92

Funded Proposals

- 2021 Changes in mechanical and chemical-structural properties of gamma irradiated calcium silicate hydrates to an absorbed dose of 189 MGy with respect to pristine samples subjected to the same temperature history, *RTE (Rapid Turnaround Proposal), NSUF (~\$36k)*
- 2021 Effect of neutron radiation on density and mechanical properties of concrete aggregates, *RTE, NSUF (~\$45k)*
- 2019 Characterization of alpha irradiated and control cementitious grouts / grout components used for nuclear waste encapsulation, *RTE, NSUF (~\$35k)*
- 2019 Changes in mechanical and chemical-structural properties of gamma irradiated calcium silicate hydrates to an absorbed dose of 200 MGy with respect to pristine samples, *RTE, NSUF (~\$35k)*
- 2017 In situ amorphization studies of forsterite, diopside and quartz under ion irradiation to be performed at the Intermediate Voltage Electron Microscopy - Tandem Facility, Argonne National Laboratory, *RTE, NSUF (~\$23k)*
- 2017 Changes on viscoelastic behavior, morphology and chemical structure of gamma irradiated calcium silicate hydrates to 1.94MGy with respect to non-irradiated samples, *RTE, NSUF (~\$23k)*
- 2017 Changes on viscoelastic behavior, morphology and chemical structure of gamma irradiated calcium silicate hydrates to 0.96MGy with respect to non-irradiated samples, *RTE, NSUF (~\$25k)*
- 2016 Changes on viscoelastic behavior, morphology and chemical structure of gamma irradiated calcium silicate hydrates with respect to non-irradiated samples, *RTE, NSUF (~\$25k)*

Allocated beam time by proposals

- 2022 Irradiation damage of nuclear reactor concrete shielding, *High Flux Isotope Reactor (HFIR), ORNL, GG-1D station*
- 2021 Comparison of 2D and bulk nanoporosity of neutron irradiated and pristine rocks, *Advanced Photon Source (APS), ANL, beam line 9-ID*
- 2019 Comparison of nanoporosity of neutron irradiated and pristine rocks, *APS, ANL, beam line 9-ID*
- 2018 Granted neutron beam time for: Atomic structure of calcium silicate deuterate gels before and after neutron irradiation, *Spallation Neutron Source (SNS), ORNL, NOMAD beam line (experiments on hold until samples come out from test reactor in spring 2023)*
- 2013 Microstructure characterization of synthetic $(\text{CaO})_x \text{SiO}_2 (\text{H}_2\text{O})_y$ as a function of Ca/Si ratio and preparation route via SANS, *FRM II, Garching, Germany (Covered experimental cost at the facility and travel)*

Conferences: Poster presentations

- 2022 A. Baral, **E. Tajuelo Rodriguez**, W. A. Hunnicutt, E. Cakmak, H. Sun, J. Ilavsky, Y. Le Pape, T. M. Rosseel, N. Garg, Effect of ultra-high gamma irradiation on calcium silicate hydrates, *presentation with paper, Proceedings of Cement and Concrete Science Conference, University of Leeds, UK, September 12th-13th, 2022 (Presented by A. Baral)*
- 2020 **E. Tajuelo Rodriguez**, A. Baral, W. Hunnicutt, N. Garg, Y. Le Pape, Effects of gamma irradiation on C-S-H structure and mechanical properties, *Gordon Research Conference on Advanced Materials for Sustainable Infrastructure Development, February 23rd-28th, 2020,*

- Ventura, CA
- 2020 A. Baral, **E. Tajuelo Rodriguez**, Y. Le Pape, N. Garg, Understanding Impact of Gamma Radiation on C-S-H Using ¹H NMR, *Gordon Research Conference on Advanced Materials for Sustainable Infrastructure Development*, February 23rd-28th, 2020, Ventura, CA (presented by N. Garg)
- 2018 **E. Tajuelo Rodriguez**, W. A. Hunnicutt, P. Mondal, Y. Le Pape, Effects of irradiation on C-S-H and minerals, *Conference to celebrate the centennial of Laboratory of Construction Materials*, August 19th-22nd, 2018, Forum Rolex, EPFL, Lausanne, Switzerland
- 2013 **E. Tajuelo**, M. Zalzale, M. Saeidpour, S. H. Cachia and M. Etzold, C-S-H solid morphology/composition and water transport at paste level, *Transcend Final conference*, November 4th -6th, 2013, Guildford, UK
- 2013 **E. Tajuelo Rodriguez**, I. G. Richardson, L. Black, Science Outreach: Cement Inside-Out, *Transcend Final conference*, November 4th-6th, 2013, Guildford, UK
- 2012 **E. Tajuelo Rodriguez**, I. G. Richardson, L. Black, K. Garbev, D. Merz, Morphology and structure of fresh mechanochemically synthesized C-S-H, *Cement and Concrete Science Conference*, September 17th-18th, 2012, Queen's University, Belfast, UK
- 2011 **E. Tajuelo Rodriguez**, I. G. Richardson, L. Black, Morphology and structure of 7-year old mechanochemically synthesized C-S-H, *Cement and Concrete Science Conference*, September 12th -13th, 2011, Imperial College, London

Marie Curie ITN Transcend meetings: Poster presentations

- 2013 E. Tajuelo, I. G. Richardson, L. Black, A. Nonat, Relationship between composition, structure and morphology in C-S-H, *Transcend 5th Meeting*, February 13th-14th, 2013, Lyon, France
- 2012 E. Tajuelo, I. G. Richardson, L. Black, Chemical composition, structure and morphology of C-S-H, *Presented at a lecture by Prof. Jim Al-Khalili as an example on how to adapt scientific content for a school classroom*, February 2nd, 2012, EPFL, Lausanne, Switzerland
- 2011 E. Tajuelo, I. G. Richardson and L. Black, Relationship between composition, structure and morphology in C-S-H, *Transcend 3rd Meeting*, April 16th-17th, 2012, Lund, Sweden
- 2011 E. Tajuelo, I. G. Richardson, L. Black, Morphology of mechanochemically synthesized C-S-H, *Transcend 2nd Meeting*, September 20th-21st, 2011, Morges, Switzerland

Marie Curie ITN Transcend meetings: Progress presentations

- 2011-2014 9 Presentations at multiple locations: EPFL (Lausanne, Switzerland), Lafarge (Lyon, France), Leuven (Meeting with the Transcend project Officer from the European Commission), Barcelona (Spain), Morges (Switzerland), Lund (Sweden), Maastricht (Netherlands)

Other Presentations

- 2021 Overview of the US DOE Concrete Research, *EPRI NPC Concrete TAC virtual meeting*, August 19th, 2021
- 2020-2021 Progress on the Irradiated Concrete task of the Light Water Reactor Sustainability Program at the *Virtual Stakeholder Engagement meetings* (November 2020, November 2021)

- 2016-2022 Participation with presentations at the International Committee of Irradiated Concrete meetings and workshops
- 2011-2014 7 presentations in workshops, seminars and project meetings at EPFL (Switzerland), Lafarge (France), EMPA (Switzerland) and the University of Leeds based on PhD project content

Prizes

- 2022 Best poster award for: A. Baral, **E. Tajuelo Rodriguez**, W. A. Hunnicutt, E. Cakmak, H. Sun, J. Ilavsky, Y. Le Pape, T. M. Rosseel, N. Garg, Effect of ultra-high gamma irradiation on calcium silicate hydrates, *41st Cement and Concrete Science Conference*, University of Leeds, September 12th – 13th, 2022
- 2022 Japan Concrete Institute (JCI) Award for best paper: C. E. Torrence, A. B. Giorla, Y. Li, **E. Tajuelo Rodriguez**, J. D. Arregui Mena, T. M. Rosseel, Y. Le Pape, MOSAIC: An Effective FFT-based Numerical Method to Assess Aging Properties of Concrete, *Journal of Advanced Concrete Technology*, Vol. 19, 149-167.
- 2021 Excellent paper of the year for: C. E. Torrence, A. B. Giorla, Y. Li, **E. Tajuelo Rodriguez**, J. D. Arregui Mena, T. M. Rosseel, Y. Le Pape, MOSAIC: An Effective FFT-based Numerical Method to Assess Aging Properties of Concrete, *Journal of Advanced Concrete Technology*, Vol. 19, 149-167.
- 2014 Second prize for best student talk for: **E. Tajuelo Rodriguez**, I. G. Richardson, L. Black, A. Nonat, J. Skibsted, E. Boehm-Courjault, Chemical structure and morphology of C-S-H synthesized by silica-lime reaction and by the controlled hydration of C3S, *34th Cement and Concrete Science Conference*, University of Sheffield, September 15th-16th, 2014

Intellectual Property

- 2021-22 Submitted Invention Disclosure (additional inventor) and filed Provisional Patent: *Ultrasonic process for selective extraction of lithium and magnesium from suitable geological precursors and alkaline industrial waste materials*, lead by UCLA

Technical reviewer for Journal papers and proposals

- 2016-current Advances in Cement Research, Journal of Materials in Civil Engineering, Radiation Physics and Chemistry, Cement and Concrete Research, Journal of Advanced Concrete Technology, Journal of Nuclear Materials, Journal of Construction and Building Materials
- 2017-current Rapid Turnaround Proposals, NSUF (Nuclear Science User Facilities), ORNL LDRDs, NEUP CINR proposals

Synergistic, Committee and Science Outreach activities

- 2022-current Technical Area Coordinator for Harvesting and Characterization, International Committee on Irradiated Concrete
- 2022 Technical Area Coordinator for Disposal and Storage Issues, International Committee on Irradiated Concrete
- 2021-current Member of the ORNL Postdoctoral Engagement Committee representing the Fusion and Fission Energy and Science Directorate

2022	Chair for the Concrete Session at the 20 th Environmental Degradation of Materials in Nuclear Power Systems Conference
2019-current	Work Package Manager for Irradiated Concrete, Concrete Performance, Concrete NDE and Cross-pathway tasks, DOE Light Water Reactor Sustainability Program
2020-current	Organizer and chair of the Concrete Stakeholder Engagement meetings for the DOE Light Water Reactor Sustainability Program
2019-current	Responsible for updating progress about Irradiated Concrete Research in collaboration with Japan within the Civil Nuclear Energy Research and Development Working Group (CNWG)
2022-current	Member of the Geochemical Society serving as convener for a session on nuclear infrastructure and nuclear waste management projected for Goldschmidt conference 2023
2019-current	Member of the American Ceramics Society (Cements Division) with active participation in the YPN+1 Committee to facilitate involvement of young professionals in society activities
2017-current	Member of the American Chemical Society and the American Nuclear Society
2017-current	Mentor to interns at ORNL (Undergraduates, Graduates and Postgraduates)
2013	Sagrado Corazon School, C/ Don Pedro 14, Madrid, Spain Activity for a group of 18 students aged 16 <ul style="list-style-type: none"> • Quiz: General historical, production and use aspects of cement • Presentation: Transcend European Project, my PhD project and answers to the quiz • The use of cement outside its context in art, biology and music

Other courses and experience

2022	Laboratory Operations Supervisor Academy course, Battelle, Columbus, OH
2017	Voluntary work at Refuge of Wild Life Laguna Urpiano, Limón, Costa Rica, Sea turtle conservation project
2003	Au pair, Kilkee, County Clare, Ireland
2001-2002	Voluntary work at summer camps, Hermandades del Trabajo, Spain

Languages

<i>Spanish</i>	Mother tongue
<i>English</i>	Proficiency in writing and speaking
<i>Swedish</i>	Linköping University, Sweden, Level III for exchange students

Painting exhibitions

- | | |
|------|---|
| 2000 | Coal drawings and pastel paintings, Hermandades del Trabajo, Madrid, Spain |
| 2002 | Cultural exchange Spain-Poland, University Complutense, Madrid, Spain |
| 2007 | Engravings and pastel paintings, La Inmaculada Marillac School, Madrid, Spain |

Personal Interests

- Hiking
- Singing
- Travelling
- Getting to know other cultures
- Black and white analogue photography