Gaurav N. Sant, Ph.D.

Professor and Henry Samueli Fellow
Departments of Civil and Environmental Engineering, Materials Science and Engineering, California Nanosystems Institute (CNSI), and the Institute for Carbon Management
University of California, Los Angeles
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Research Interests: Interfacial solid-liquid, solid-vapor, and solid-liquid-vapor reactions including: dissolution, precipitation, and electrochemical corrosion with applications to: (i) cement, concrete, porous media, (ii) hard biological tissues, (iii) metals and alloys, (iv) natural and synthetic minerals, and, (v) glasses. Special focus is placed on understanding the synthesis, degradation and aging of such materials in aqueous environments of relevance to engineered, biological and geological systems, and on developing gigaton-scale pathways for carbon management, mitigation and industrial process transformations.

Education:

Purdue University, West Lafayette, IN

Doctor of Philosophy (Ph.D., Civil Engineering)	December 2009
Master of Science in Civil Engineering (M.S.C.E.)	August 2007
Bachelor of Science in Civil Engineering (B.S.C.E.)	August 2006

Employment Experience:

- University of California, Los Angeles — July 2010 – Present
  - Professor and Henry Samueli Fellow: Department of Civil & Environmental Engineering, Department of Materials Science and Engineering (07/2019-Present)
  - Director: Institute for Carbon Management (http://icm.ucla.edu/: 07/2018-Present), and, Laboratory for the Chemistry of Construction Materials (LC^2: https://www.lcc-ucla.com/: 07/2011-Present)
  - Associate Professor and Henry Samueli Fellow: Department of Civil & Environmental Engineering, Materials Science and Engineering (07/2015-Present)
  - Assistant Professor and Edward and Linda Rice Endowed Chair in Materials Science: Department of Civil and Environmental Engineering (07/2010-06/2015)
  - Faculty Member: Institute for Carbon Management, California Nanosystems Institute (CNSI), The Weintraub Center for Reconstructive Biotechnology, Smart Grid Energy Research Center, Luskin Center for Innovation
  - Consortium Coordinator: (1) Joint UCLA-NIST Consortium for Concrete Optimization using Mineral Admixtures (COMAX; 2014-2019), Members: Federal Highway Administration, BASF Corporation, NIST, Yara, Headwaters, Electric Power Research Institute, (2) Joint UCLA-NIST Consortium Transforming Construction by Carbon-Neutral Cementation and Digital Fabrication (TRANSCEND; 2018-), Members: U.S. Bureau of Reclamation, BASF Corporation, National Institute of Standards and Technology, Suffolk Construction, Electric Power Research Institute, (3) Joint UCLA-NIST Consortium Design and Prediction of Concrete's Field Performance using Artificial Intelligence (DESIGN-AI; 2019-), Members: BASF Corporation, ClimateWorks Foundation, Electric Power Research Institute

- Ecole Polytechnic Fédérale de Lausanne, Switzerland: January 2010 – October 2010
  Research Scientist in the Laboratory of Construction Materials
- Purdue University, West Lafayette, IN: August 2006 – December 2009
  Graduate Research Assistant in the School of Civil Engineering
- Ecole Polytechnic Fédérale de Lausanne, Switzerland: August 2008 – December 2008
  Visiting Researcher in the Laboratory of Construction Materials
- National Institute of Standards and Technology, Gaithersburg: January 2007, May 2007
  Visiting Researcher in the Inorganic Materials Group: Engineering Laboratory
- Purdue University, West Lafayette, IN: January 2005 – August 2006
  Undergraduate Research Assistant in the School of Civil Engineering

Teaching Activities:

- UCLA: (1) Statics and Dynamics (C&EE101): W11, F11, F12, F13, F14, F17, (2) The Structure, Properties and Processing of Civil Engineering Materials (C&EE104, C204): W12, W13, W14, W15, W16, (3) Rigid and Flexible Pavements: Design, Materials and Serviceability (C&EE 182, C282): S13, S14, (4) The Nature and Process of Research (C&EE 298): W19
- Purdue University: (1) Teaching Assistant for a Graduate Course on: The Properties and Production of Concrete (CE530): Fall 2007, (2) Teaching Assistant for: Elementary and Intermediate Algebra (MA110 and MA113): Spring and Fall 2003

Honors and Awards:

1) CO_2Concrete™: Global "Top10" Innovation: Innovation for Cool Earth Forum, (2018)
2) Finalist: NRG COSIA Carbon XPRIZE, (2018)
3) Best Presentation Award: American Institute of Chemical Engineers (AIChE) Annual Meeting, Minneapolis, MN: Session on Novel Approaches for Carbon Dioxide Utilization for: Sant et al.: "CO_2 upcycling by mineralization of a carbonate-based cementation material: Processing-property relationships of CO_2NCRETE™", (2017)
4) Best Paper Award(s):
   (A) Oey, T., Kumar, A., Pignatelli, I., Yu, Y., Neithalath, N., Bullard, J. W., Bauchy, M., Sant, G., "Topological controls on the dissolution kinetics of glassy aluminosilicates", Journal of the American Ceramic Society, 100(12), 5521-5527, (2017), and,
   (B) Biernacki, J. J., Bullard, J. W., Sant, G., Brown, K., Glasser, F. P., Jones, S., Ley, T., Livingston, R., Nicoleau, L., Olek, J., Sanchez, F., "Cements in the 21st century: Challenges, perspectives, and opportunities", Journal of the American Ceramic Society, 100(7), 2746-2773, (2017)
5) RILEM: Gustavo Collonnetti Medal, (2017)
6) UCLA: "The Optimists", (2016)
7) Jean-Claude "J.-C." Roumain Innovation in Concrete Award, ACI Foundation's Strategic Development Council, (2016)
8) Walter P. Moore, Jr. Faculty Achievement Award: American Concrete Institute, (2016)
9) Hellman Fellow: Hellman Fellows Program, (2013)
10) Early CAREER Award: National Science Foundation, (2013)
11) Bryant Mather 'Best Paper Award' from Concrete Materials Section: Transportation Research Board of the National Academies (2006, 2008)

12) Fred Burggraf Award for 'The Best Paper by a Young Researcher': Transportation Research Board of the National Academies, (2007)
13) Fellowship for Strategies for Reducing Early-Age Cracking Today (REACT): School of Civil Engineering, Purdue University, (2008)
14) William L. "Bill" Dolch Graduate Scholarship for 'Outstanding Research in Materials Science': The School of Civil Engineering, Purdue University, (2007)
15) Award for 'Outstanding Research in Concrete Materials by an Undergraduate': The School of Civil Engineering, Purdue University, (2006)
16) Recipient of The Summer Undergraduate Research Fellowship (SURF): Awarded by Purdue University, College of Engineering (2006)
17) Poster Presentation Award (2nd Place) - ACBM: Semi-Annual Review, (2005)
18) Member of Chi Epsilon: National Civil Engineering Honors Society, (2005 – Present)
19) Member of the Dean's List and Semester Honor's, Purdue University, (2002, 2003)

Research Advisee Awards:

1) *Seohyun Kim:* UCLA Engineering: High-School Summer Research Program (HSSRP), Presentation Award (2012)
2) *Tandre J-P. Oey:* UCLA Engineering: Harry M. Showman Prize, Undergraduate, (2014)
3) *Tandre J-P. Oey:* UCLA Department of Civil & Environmental Engineering: Outstanding M.S. Student Award, (2015)
4) *Tandre J-P. Oey:* U.S. Department of Transportation: Dwight D. Eisenhower Transportation Fellowship Program, (2017)
5) *Tandre J-P. Oey:* American Ceramic Society, Cements Division: Best Paper Award (with: Kumar, A., Pignatelli, I., Yu, Y., Neithalath, N., Bullard, J. W., Bauchy, M., and Sant, G.), (2018)
6) *Gabriel Falzone:* Best Presentation Award: American Institute of Chemical Engineers (AIChE) Annual Meeting, (2017)
7) *Tandre J-P. Oey:* UCLA Engineering: Harry M. Showman Prize, Ph.D. Student, (2019)

Research Advisees:

- <u>High-School:</u> Sondos Bandran (GED '13), Seohyun Kim (GED '13), Carolyn Zhang (GED '13), Cecilia Vong (GED '14), Janit Niyom (GED '14), Syung Min (GED '15), Lars Peterson (GED '19), Alexander Pritzker (GED '18), Nathan Deng (GED '20), Sadie Sarkisian (GED '21)
- <u>Undergraduate:</u> Daniel Matson (BSCE 2008, Purdue University), Scott Kobs (BSCE 2009, Purdue University), Ashish Samdariya (BSCE 2008, IIT Bombay/Purdue University), Varun Sharma (BSCE 2010, IIT Bombay/EPFL), Dennis Sanchez (BSCE 2013, UCLA), Kevin Santos (BSCE 2013, UCLA), Tandre Oey (BSCE 2014, UCLA), Davis Thomas (BSCE 2014, UCLA), Jialin Li (BSCE 2015, UCLA), Vivek Manickam (BSCE 2015, UCLA), Paul Lee (BSCE 2015, UCLA), Peter Lewis (BSChE, 2014), Jialin Li (BSCE 2014), Julyan Stoian (BSCE, UCLA 2016), Galen Egan (BSCE, UCLA 2016), Sabrina June Ketel (BSCE, UCLA 2014), Clint Bannout (BSCE, UCLA 2016), Gabe Falzone (UCLA, MSE 2014), Allison Light (BSCE, UCLA 2017), Rhonda Hacchache (BSCE, UCLA 2016), Melanie Rivera (UCLA, BSCE 2016), Gabriel F. Concepcion (BSCE, UCLA 2016), Yunji Zhang (BSCE, UCLA 2016), Sierra Kennison (BSCE, UCLA 2016), Bartu Ertemgli (BSCE, UCLA 2017), Mingjie Zhao (BSCE, UCLA 2017), Maxwell Armenta (BSCE, UCLA

2017), Yinan Pei (BSCE, UCLA 2015), Morolake Omoya (BSCE, UCLA 2016), Sarah Ho (BSCE, UCLA 2017), Jason Timmons (BSMSE, UCLA 2017), Megan Nazareno (BSCE, UCLA 2017), Ryan Worley (BSCE, UCLA 2017), Ka Lam Cheung (BSCE, UCLA 2017), Cecilia Vong (BSCE, UCLA 2018), Cynthia Huang (BSMIMG, UCLA 2017), Akira Wada (BSMSE, UCLA 2016), Jesse Wong (BSMSE, UCLA 2017), Joseph Gall (BSMSE, UCLA 2018), Natalia Ramirez (BSCE 2020), Ellie Kim (BSMSE 2020), Ahmed Al-Kashri (BSCE 2020), Daniel Sameh (BSCE 2020), Melissa Bruno (BSCE 2021)

- Graduate: Caterina Gianocca (MSMSE 2010, EPFL), Guillermo Puerta Falla (C&EE Ph.D 2016), Peng Guo (C&EE Ph.D. 2017), Zhenhua Wei (C&EE Ph.D. 2017), Alexander Thiele (M&AE Ph.D., 2016), Tandre Oey (C&EE Ph.D. 2019), Gabriel Falzone (MSE Ph.D. 2019), Yi-Hsuan Hsiao (C&EE Ph.D. 2019), Sabrina Ketel (C&EE M.S. 2017), Zhenyu She (M&AE M.S. 2018), Benjamin Young (MAE M.S. 2017), Zhuangzhuang Liu (Chang'an University Ph.D. 2016), Linda Monfardini (University of Brescia, Ph.D. 2017), Akira Wada (MSE, M.S. 2017), *Shiqi Dong (MSE, Ph.D. 2017-), Sara V. Castano (M&AE Ph.D. 2017-),* Jason Timmons (MSE, M.S. 2019), *Steven Bustillos (C&BE Ph.D. 2018-), Boya Ouyang (MSE Ph.D. 2019-)*
- Post-Doctoral: Aditya Kumar (Ph.D., Ecole Polytechnique Federale de Lausanne, 2012-2015), Jian Huang (Ph.D., Shanghai Jiao Tong University, 2012-2015), Lauren Gomez (Ph.D., Assoc. Prof., UANL, 2013-2015), Kirk Vance (Ph.D., Arizona State University, 2014-2015), Isabella Pignatelli (Ph.D., Université de Lorraine, 2014-2016), Bu Wang (Ph.D., Alfred University, 2016-) Anoop Krishnan (Ph.D., Indian Institute of Science, 2015-), Monday Okoronkwo (Ph.D., University of Aberdeen, 2016-), *Erika Callagon (Ph.D., University of Illinois, Chicago, 2016-),* Hyukmin Kweon (Ph.D., University of Utah, 2017-2019)*, Iman Mehdipour (Ph.D., Missouri University of Science and Technology, 2017-),* Rachel Giron (Ph.D., Lehigh University, 2017-2018), Zongsu Wei (Ph.D., University of Toledo, 2017-), *Xin Chen (Ph.D., University of Illinois, Chicago, 2017-), Dale Prentice (Ph.D., University of Sheffield, 2018-), Bi Yun Zhen Wu, (Ph.D., University of Copenhagen, 2018-), Gabriel Falzone (Ph.D., University of California, Los Angeles, 2019-), BK Sharu (Ph.D., IIT-Bombay/Monash University, 2019-), Thiyagarajan Ranganathan(Ph.D., IIT-Madras, 2019-), Ross Arnold (Ph.D., University of Calgary, 2019-), Marie Collin (Ph.D., CEA-Marcoule, 2019-)*
- Ph.D. Committee Service: Mavis Wong (C&EE, Ph.D. 2014), Rui Huang (M&AE, Ph.D. 2015), Joe Severino (MSE, Ph.D. 2014), M. Jason Roth (C&EE, Ph.D. 2013), Yubo Wang (M&AE, Ph.D. 2015), Christopher Motter (C&EE, Ph.D. 2014), Joshua Chynoweth (M&AE, Ph.D. 2015), Kamil B. Afacan (C&EE, Ph.D. 2014), Trevor Williamson (CA&E, UT-Austin, Ph.D. 2017), Yusuf 'Joseph' Attia (M&AE, Ph.D. 2016), David Pereira (BioE, Ph.D. 2017), Yingtian Yu (C&EE, Ph.D. 2018), David Pereira (BE, Ph.D. 2017), Michael Reyes (MSE, Ph.D. 2018), Han Liu (C&EE, Ph.D. 2022)

Academic Placements:

- ***Aditya Kumar:*** Assistant Professor (tenure-track), Missouri University of Science and Technology, Department of Materials Science and Engineering, (2015-)
- ***Jian Huang:*** Associate Professor, Shanghai Institute of Ceramics, Chinese Academy of Sciences, Center for High Performance and Superfine Microstructure, (2017-)
- ***Isabella Pignatelli:*** Assistant Professor (tenure-track), Université de Lorraine, GeoRessources: Laboratory for Geology, (2017-),

- ***Bu Wang:*** Assistant Professor and Grainger Institute for Engineering Fellow (tenure-track), University of Wisconsin, Madison, Department of Civil and Environmental Engineering, (2018-)
- ***Anoop Krishnan:*** Assistant Professor (tenure-track), Indian Institute of Technology, New Delhi, Department of Civil and Environmental Engineering, (2018-)
- ***Monday Uchenna Okoronkwo:*** Assistant Professor (tenure-track), Missouri University of Science and Technology, Department of Chemical Engineering, (2018-)
- ***Zongsu Wei:*** Assistant Professor (tenure-track), Aarhus University, Department of Biological and Chemical Engineering, (2019-)
- ***Erika Callagon La Plante:*** Assistant Professor (tenure-track), University of Texas, Arlington, Department of Materials Science and Engineering, (2020-)

Journal Publications: *(Citations: 3716, h-index: 32, Source: Google Scholar, September 2019: *Undergraduate or Graduate Student, #Post-Doctoral Scientist, **High-School Student)*

J1) Sant, G., Lura, P. and Weiss, W.J., 'Measurement of Volume Changes in Cementitious Materials at Early Ages: Review of Testing Protocols and Interpretation of Results', The Transportation Research Record, 1979, pp. 21-29, (2006)

J2) Sant, G., Ferraris, C. F., and Weiss, W. J., 'Rheological Property Measurements of Cement Pastes at Early Ages: A Discussion of Structure Formation and Mechanical Property Development', Cement and Concrete Res., 38(11), pp. 1286-1296, (2008)

J3) Sant, G., Rajabipour, F., and Weiss, W. J., 'The Influence of Temperature on Electrical Conductivity Measurements and Maturity Predictions in Cementitious Materials during Hydration', The Indian Concrete Journal, April, pp. 1-8, (2008)

J4) Bentz, D., Sant, G., and Weiss, W. J., 'Early-Age Properties of Cement-Based Materials: I. Influence of Cement Fineness', ASCE Journal of Materials in Civil Engineering, 20(7), pp. 502-508, (2008)

J5) Weiss, W. J., Lura, P., Rajabipour, F., and Sant, G., 'Performance of Shrinkage Reducing Admixtures at Different Humidities and at Early Ages', ACI Materials Journal, September-October, 105(5), pp. 478-486, (2008)

J6) Rajabipour, F., Sant, G., and Weiss, W. J., 'Interactions between Shrinkage Reducing Admixtures and Cement Paste's Pore Solution', Cement and Concrete Research, 38(5), pp. 606-615, (2008)

J7) Radlinska A., Rajabipour F., Bucher B., Henkensiefken R., Sant G., and Weiss W. J., 'Shrinkage Mitigation Strategies in Cementitious Systems: A Closer Look at Differences in Sealed and Unsealed Behavior', The Transportation Research Record, 2070, pp. 59-67, (2008)

J8) Sant, G., Henkensiefken, R., and Bucher, B., 'Internal Curing and Shrinkage Reducing Admixtures for Concrete Canoes', The Concrete Canoe Magazine, pp. 12-20, (2008)

J9) Sant, G., Dehadrai, M., Lura, P., Bentz, D., Ferraris, C. F., Bullard J., and Weiss, W.J., 'Detecting the Fluid-to-Solid Transition in Cement Pastes: Part I – Assessment Techniques', Concrete International, 31(6), pp. 27, (2009)

J10) Sant, G., Dehadrai, M., Bentz, D., Lura, P., Ferraris, C. F., Bullard J., and Weiss, W.J., 'Detecting the Fluid-Solid Transition in Cement Pastes: Part II: Comparison of Experimental and Numerical Techniques', Concrete Int., 31(6), pp.27, (2009)

J11) Sant, G., and Weiss, W. J., 'Using X-Ray Absorption to Assess Moisture Movement in Cementitious Composites', The Journal of ASTM International, 6(9), pp. 15, (2009)

J12) Sant, G., Eberhardt, A., Bentz, D., and Weiss, W. J., 'The Influence of Shrinkage Reducing Admixtures (SRAs) on Moisture Movement in Cementitious Materials at Early Ages', The ASCE Journal of Materials in Civil Engineering, 22(3), pp. 10, (2010)

J13) Sant, G., Lothenbach, B., Juilland, P., Lesaout, G., Scrivener, K., and Weiss, W. J., 'The Origin of Early-Age Expansions in Cementitious Materials Containing Shrinkage Reducing Admixtures', Cement and Concrete Research, 41(3), pp. 218-229, (2011)

J14) Sant, G., Bentz, D., and Weiss, W. J., 'Capillary Porosity Depercolation in Cement-Based Materials: Measurement Techniques and Factors that Influence their Interpretation', Cement and Concrete Research, 41(8), pp. 854-864, (2011)

J15) Abou-Najm, M., Jesiek, J., Mohtar, R., Lura, P., and Sant, G., 'Assessing the Role of the Pore Solution Concentration on Volume Changes in an Unsaturated Soil during Drying', Geoderma, 187-188, pp. 31-40, (2012)

J16) Sant, G., 'The Influence of Temperature on Autogenous Volume Changes in Cementitious Materials Containing Shrinkage Reducing Admixtures', Cement and Concrete Composites, 34, pp. 855-865, (2012)

J17) Kumar, A.,[#] Sant, G. Patapy, C., Gianocca, C.,[*] and Scrivener, K. L., 'The Influence of Sodium and Potassium Hydroxide on Alite Hydration: Experiments and Simulations', Cement and Concrete Research, 42(11), pp. 1513-1523, (2012)

J18) Sant, G., Kumar, A.,[#] Patapy, C., Le Saout, G., and Scrivener, K. L., 'The Influence of Sodium and Potassium Hydroxide on Autogenous and Drying Shrinkage in Cementitious Materials', Cement and Concrete Research, 42, pp. 1447-1455, (2012)

J19) Oey, T.,[*] Kumar, A.,[#] Bullard, J. W., Neithalath, N., and Sant, G., 'The Filler Effect: The Influence of Filler Content and Surface Area on Cementitious Reaction Rates', Journal of the American Ceramic Society, 96(6), pp. 1978-1990, (2013)

J20) Kumar, A.,[#] Oey, T.,[*] Puerta Falla, G.,[*] Henkensiefken, R., Neithalath, N., and Sant, G., 'A Comparison of Intergrinding and Blending Limestone on Reaction and Strength Evolution in Cementitious Materials', Construction and Building Materials, 43, pp. 428–435, (2013)

J21) Vance, K., Aguayo, M., Oey, T.,[*] Sant, G., Neithalath, N., 'Hydration and Strength Development in Ternary Portland Cement Blends Containing Limestone and Fly Ash or Metakaolin', Cement and Concrete Composites, 39, pp. 93-103, (2013)

J22) Kumar, A.,[#] Oey, T.,[*] Kim, S.,[**] Thomas, D.,[*] Badran,[**] S., Li, J.,[*] Fernandes, F.,[*] Neithalath, N., Sant, G., 'Simple Methods to Estimate the Influence of Limestone Fillers on Reaction and Property Evolution in Cementitious Materials', Cem. and Concr. Comp., 42, pp. 20-29, (2013)

J23) Kumar, A.,[#] Reed, J., and Sant, G., 'Vertical Scanning Interferometry (VSI): A New Method to Measure the Dissolution Dynamics of Cementitious Minerals', The Journal of the American Ceramic Society, 96(9), pp. 2766-2778, (2013)

J24) Vance, K., Kumar, A.,[#] Sant, G., Neithalath, N., 'The Rheological Properties of Ternary Binders Containing Portland Cement, Limestone and Metakaolin or Fly Ash', Cement and Concrete Research, 52, pp. 196–207 (2013)

J25) Fernandes, F.,[*] Manari, S., Aguayo, M., Santos, K.,[*] Oey, T.,[*] Wei, Z.,[*] Falzone, G.,[*] Neithalath, N., Sant, G., 'On the Feasibility of Using Phase Change Materials (PCMs) to Mitigate Thermal Cracking in Cementitious Materials', Cement and Concrete Composites, 51, pp. 14-26, (2014)

J26) Kumar, A.,# Ketel, S.,* Vance, K., Oey, T.,* Neithalath, N., Sant, G., 'Water Vapor Sorption in Cementitious Materials: Measurement, Modeling and Interpretation', Transport in Porous Media, 103(1), pp. 1-30, (2014)

J27) Huang, J.,# Valenzano, L., Singh, T. V., Pandey, R., Sant, G., 'The Influence of (Al, Fe, Mg) Impurities on Triclinic Ca_3SiO_5: Interpretations from DFT Calculations', Crystal Growth and Design, 14(5), pp. 2158–2171, (2014)

J28) Thiele, A. M.,* Kumar, A.,# Sant, G., Pilon, L., 'Effective Thermal Conductivity of Three-Component Composites Made of Spherical Capsules in a Continuous Matrix', International Journal of Heat and Mass Transfer, 73, pp. 177-185, (2014)

J29) Das, S., Aguayo, M., Dey, V., Kachala, R., Mobasher, B., Sant, G., Neithalath, N., 'The fracture response of blended formulations containing limestone powder: Evaluations using two-parameter fracture model and digital image correlation', Cement and Concrete Composites, 53, pp. 316-326, (2014)

J30) Aguayo, M., Yang, P., Vance, K., Sant, G., Neithalath, N., 'Electrically Driven Cl^- Ion Transport in Blended Binder Concretes: Insights from Experiments and Numerical Simulations', Cement and Concrete Research, 66, pp. 1-10, (2014)

J31) Vance, K., Dakhane, A., Sant, G., Neithalath, N., 'The Rheology of Alkali Activated Fly Ash Suspensions: Influence of the Activator Type and Concentration', Rheologica Acta, 53(10-11), pp. 843-855, (2014)

J32) Falzone, G.,* Balonis, M., Sant, G., 'X-AFm Stabilization as a Mechanism of Bypassing Conversion Phenomena in Calcium Aluminate Cements', Cement and Concrete Research, 72, pp. 54-68, (2015)

J33) Stoian, J.,* Oey, T.,* Bullard, J. W., Huang, J.,# Kumar, A.,# Balonis, M., Terrill, J., Neithalath, N., and Sant, G., 'The Prehydration of Cement and its Mitigation', Cement and Concrete Research, 70, pp. 94-103, (2015)

J34) Oey, T.,* Stoian, J.,* Li, J.,* Vong, C.,** Balonis, M., Kumar, A.,# Franke, W., Sant, G., 'A Comparison of $Ca(NO_3)_2$ and $CaCl_2$ Admixtures on Reaction, Setting, Strength Evolutions in Plain and Blended Cement Formulations', ASCE Journal of Materials in Civil Engineering, 27(10), pp. 12, (2014)

J35) Thiele, A.,* Sant, G., Pilon, L., 'Diurnal Thermal Analysis of Concrete-Microencapsulated PCM Composite Walls', Energy Conversion and Management, 93, pp. 215-227, (2015)

J36) Vance, K.,# Sant, G., Neithalath, N., 'The Rheology of Cementitious Suspensions: A Closer Look at Experimental Parameters and Property Determinations using Common Rheological Models', Cement and Concrete Composites, 59, pp. 38-48, (2015)

J37) Vance, K.,# Arora, A., Sant, G., Neithalath, N., 'Rheological Evaluations of Interground and Blended Cement-Limestone Suspensions', Construction and Building Materials, 79, pp. 65-72, (2015)

J38) Jennings, H., Kumar, A.,# Sant, G., 'Quantitative discrimination of the nano-pore-structure of cement paste during drying: New insights from water sorption isotherms', Cement and Concrete Research, pp. 10, (2015)

J39) Das, S., Aguayo, M., Sant, G., Mobasher, B., Neithalath, N., 'Fracture process zone and tensile behavior of blended binders containing limestone powder', Cement and Concrete Research, 73, pp. 51-62, (2015)

J40) Kumar, A.,# Lewis, P.,* Balonis, M., Di Carlo, D., Sant, G., 'On the Application of Inertial Microfluidics for the Size-Based Separation of Polydisperse Cementitious Particulates', Frontiers in Materials, 2, pp. 48, (2015)

J41) Thiele, A. M.,* Jamet, A., Sant, G., Pilon, L., 'Annual Energy Analysis of Concrete Containing PCMs as an Energy Efficient Materials for Building Envelopes', Energy Conversion and Management, 103, pp. 374-386, (2015)

J42) Puerta-Falla, G.,* Balonis, M., Le Saout, G., Falzone, G.,* Zhang, C.,** Neithalath, N., Sant, G., 'Elucidating the Role of the Aluminous Source on Limestone Reactivity in Cementitious Materials', Journal of the American Ceramic Society, 98(12), pp. 4076-4089, (2015)

J43) Wang, B.,# Yu, Y., Pignatelli,# I., Sant, G., Bauchy, M., 'Nature of Radiation-Induced Defects in Quartz', Journal of Chemical Physics, 143, pp. 024505, (2015)

J44) Huang, J.,# Valenzano, L., Sant, G., 'Framework and Channel Modifications in Mayenite ($12CaO{\cdot}7Al_2O_3$) Nanocages By Cationic Doping', Chemistry of Materials, 27(13), pp. 4731-4741, (2015)

J45) Puerta-Falla, G.,* Kumar, A.,# Gomez-Zamorano, L.,# Bauchy, M., Neithalath, N., Sant, G., 'The influence of filler type and surface area on the hydration rates of calcium aluminate cement', Construction and Building Materials, 96, pp. 657-665, (2015)

J46) Vance, K.,# Falzone, G.,* Pignatelli, I.,# Bauchy, M., Sant, G., 'The Direct Carbonation of $Ca(OH)_2$ using Liquid and Supercritical CO_2: Implications on Carbon-Neutral Cementation', Industrial and Engineering Chemistry Research, 54(36), pp. 8908-8918, (2015)

J47) Huang, J.,# Wang, B.,# Yu, Y., Valenzano, L., Bauchy, M., Sant, G., 'Electronic Origin of Doping-Induced Enhancements of the Reactivity: Case Study of Tricalcium Silicate', Journal of Physical Chemistry C, 119(46), pp. 25991-25999, (2015)

J48) Yu, Y., Wang, M., Zhang, D., Wang, B.,# Sant, G., Bauchy, M., 'Stretched exponential relaxation of glasses at low temperature', Physical Review Letters, 115, pp. 165901, (2015)

J49) Young, B., Fujii, A., Thiele, A. M.,* Kumar, A.,# Sant, G., Taciroglu, E., Pilon, L., 'Effective Elastic Moduli of Core-Shell-Matrix Composites', Mechanics of Materials, 92, pp. 94-106, (2016)

J50) Thiele, A. M.,* Wei, Z.,* Falzone, G.,* Young, B., Neithalath, N., Sant, G., Pilon, L., 'Figure of Merit for the Thermal Performance of Cementitious Composites Containing Phase Change Materials', Cement and Concrete Composites, 65, pp. 214-226, (2016)

J51) Pignatelli, I.,# Kumar, A.,# Field, K., Wang, B.,# Yu, Y., Le Pape, Y., Bauchy, M., and Sant, G., 'Direct Experimental Evidence for Differing Reactivity Alterations of Minerals following Irradiation: The Case of Calcite and Quartz', Scientific Reports, 6, 20155, pp. 1-10, (2016)

J52) Oey, T.,* Kumar, A.,# Falzone, G.,* Huang, J.,# Kennisson, S.,* Bauchy, M., Neithalath, N., Bullard, J., and Sant, G., 'The Influence of Water Activity on the Hydration Rate of Tricalcium Silicate', Journal of the American Ceramic Society, 99(7), pp. 2481-2492, (2016)

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C20) Kumar, A., Ketel, S., Oey, T., Vance, K., Neithalath, N., Sant, G., 'Water Vapor Sorption in Cementitious Materials: Measurement, Modeling and Interpretation', International Conference in memory of R. N. Raikar on Advances in Cement-Based Materials, pp. 9, Mumbai, India, (20-22 December 2013)

C21) Stoian, J., Oey, T., Bullard, J. W., Huang, J., Kumar, A., Balonis, M., Terrill, J., Neithalath, N., and Sant, G., 'The Prehydration of Cement and its Mitigation: New Insights from Experiments and Simulations', 2nd International Congress on Durability of Concrete, New Delhi, India (December 4-6, 2014)

C22) Franke, W., Balonis-Sant, M., Oey, T., and Sant, G., 'The Fate of Nitrate Ions in Concrete under the Focus of Corrosion Inhibition', 2nd International Congress on Durability of Concrete, New Delhi, India (December 4-6, 2014)

C23) Oey, T., Falzone, G., Huang, J., Kumar, A., Balonis, M., Sant, G., 'The Influences of Water Activity on the Hydration Behavior of Model and Ordinary Portland Cement Systems', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 11, (13-16 October, 2015)

C24) Kumar, A., Lewis, P., Balonis, M., Di Carlo, D., Sant, G., 'The Application of Inertial Microfluidics for the Size-Based Separation of Polydisperse Cementitious Particles', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 10, (13-16 October, 2015)

C25) Jennings, H., Kumar, A., Sant, G., 'Quantitative Evaluation of Nano-Pore Structure of Cement Paste during Drying: New Insights from Water Vapor Sorption Isotherms', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 11, (13-16 October, 2015)

C26) Huang, J., Valenzano, L., Sant, G., 'The Influence of (Al, Fe, Mg) Impurities on Triclinic Ca_3SiO_5: Interpretations from DFT Calculations', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 12, (13-16 October, 2015)

C27) Huang, J., Valenzano, L., Sant, G., 'The Water Sensitivity of Triclinic Tricalcium Silicate (TI-Ca_3SiO_5) Interrogated from First Principles', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 12, (13-16 October, 2015)
C28) Falzone, G., Balonis, M., Sant, G., 'X-AFm Stabilization as a Mechanism of Preventing Conversion Phenomena in Calcium Aluminate Cements', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 16, (13-16 October, 2015)
C29) Falzone, G., Wei, Z., Fernandes, F., Aguayo, M., Neithalath, N., Pilon, L., Balonis, M., Sant, G., 'Phase change materials (PCMs): A novel means to mitigate thermal cracking in restrained concrete elements, 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 15, (13-16 October, 2015)
C30) Oey, T., Kumar, A., Bullard, J. W., Neithalath, N., Sant, G., 'The Filler Effect: The Influence of Filler Content and Surface Area on Cementitious Reaction Rates', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 11, (13-16 October, 2015)
C31) Stoian, J., Oey, T., Bullard, J. W., Huang, J., Kumar, A., Balonis, M., Terrill, J., Neithalath, N., Sant, G., 'The Prehydration of Cement and its Mitigation', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 12, (13-16 October, 2015)
C32) Gomez-Zamorano, L. Y., Sant, G., Balonis, M., Kumar, A., Erdemli, B., Neithalath, N., 'C-(N)-S-H and N-A-S-H Gels: Structure, Composition and Thermochemical Properties', 14th International Congress on the Chemistry of Cement, Beijing, China, pp. 14, (13-16 October, 2015)
C33) Oey, T, Huang, C., Worley, R., Ho, S., Timmons, J., Cheung, K., Kumar, A., Bauchy, M., Sant, G., 'Linking Fly Ash Composition to Performance in Cementitious Systems', World of Coal Ash, Nashville, TN, United States, pp. 10, (May 5-7, 2015)
C34) Puerta-Falla, G., Balonis, M., Le Saout, G., Neithalath, N., Sant, G., 'The Influence of Metakaolin on Limestone Reactivity in Cementitious Materials' Calcined Clays for Sustainable Concrete, Lausanne, Switzerland, pp. 11-19, (June 22-25, 2015)
C35) Falzone, G., Puerta-Falla, G., Wei, Z., Kumar, A., Neithalath, N., Sant, G., 'The Mechanical Properties of Cementitious Composites Containing Soft and Stiff Inclusions: Experiments and Effective Medium Approximations', pp. 10, 2nd R. N. Raikar Memorial International Conference, Mumbai, India, (2015)
C36) Krishnan, N. A., Wang, B., Falzone, G., Le Pape, Y., Neithalath, N., Pilon, L., Bauchy, M., and Sant, G., 'Confined Water in Layered Silicates: The Origin of Anomalous Thermal Expansion Behavior in Calcium-Silicate-Hydrates', International Conference on Advances in Construction Materials and Systems (ICACMS), pp. 5, Chennai, India, (September 2017)

Patent Filings:

PT1) Sant, G., Balonis-Sant, M. and Kurtis, K., U.S. Patent: 9598314, 'Corrosion inhibiting cementitious compositions', (March 21, 2017)
PT2) Sant, G., and Balonis-Sant, M., U.S. Patent: 9725366, 'Inorganic admixtures for mitigating against conversion phenomena in high-alumina cements', (August 8, 2017)

*** In addition to these granted patents, >15 other intellectual property disclosures have been filed as provisional applications, or as patent cooperation treaty (PCT) filings.

Presentations:

P1) Sant, G., Lura, P., Weiss, W. J., 'A Discussion of Analysis Approaches for Determining 'Time-Zero' from Chemical Shrinkage and Autogenous Strain measurements in Cement Pastes', RILEM International Conference, Volume Changes of Hardening Concrete, Lyngby, Denmark, (August 2006)

P2) Sant, G., Rajabipour, F., Lura, P. and Weiss, W. J., 'Volume Changes in Pastes Containing Shrinkage Reducing Admixtures under Autogenous and Drying Conditions', 12th International Congress on the Chemistry of Cement, Montreal, Canada, (July 2007)

P3) Sant, G., and Weiss, W. J., 'Assessing Fluid Transport in Cementitious Materials using X-Ray Absorption', Annual Meeting of the Cements Division of the American Ceramic Society, Materials Science & Technology 2007, Detroit, Michigan, (September 2007)

P4) Sant, G., Samdariya, A., and Weiss, W. J., 'Tests to Assess Volume Change and Residual Stress Development in Expansive Cement Systems', ACI-223 Committee Meeting, ACI Fall Convention, Puerto Rico, USA, (October 2007)

P5) Sant, G., and Weiss, W. J., 'Examining Moisture Movement in Hydrating Cementitious Systems Using X-Ray Absorption', Open Paper Session, ACI Fall Convention, Puerto Rico, USA, (October 2007)

P6) Sant, G., Dehadrai, M., Ferraris, C. F., and Weiss, W. J., 'The Early-Age Setting Behavior of Cement Pastes Studied using Rheological Properties and Ultrasonic Wave Propagation', Session on Early-Age Test Methods, St. Louis, MO, (November 2008)

P7) Sant, G., 'The Origin of Early-Age Expansions in Cement Pastes containing Shrinkage Reducing Admixtures (SRAs)', STI-IMX, Laboratory for Construction Materials, Ecole Polytechnique Fédérale de Lausanne, Switzerland, (December 2008)

P8) Sant, G., 'A Summary of the Use of Shrinkage Reducing Admixtures (SRAs) to Mitigate Volume Changes in Cementitious Materials at Early Ages', Invited Presentation at Sunanda Specialty Coatings Private Limited, Mumbai, India, (December 2008)

P9) Sant, G., Dehadrai, M., Bentz, D., and Weiss, W. J., 'Identifying the Fluid-to-Solid Transition in Cementitious Materials at Early Ages using Ultrasonic Wave Velocity and Computer Simulation', ACI-SP 259, Transition from a Fluid to Solid: Re-examining the Behavior of Concrete at Early Ages, San Antonio, Texas, USA, (March 2009)

P10) Sant, G., 'A Summary of Research Related to the Mitigation of Volume Changes in Cementitious Materials at Early Ages', Invited Presentation at Exponent Inc. (Failure Analysis Associates), Menlo Park, California, (November 2009)

P11) Sant, G., Lothenbach, B., Juilland, P., Le Saout, G., Weiss, W. J., and Scrivener, K. L., 'The Origin of Early Age Expansions in Cement Pastes Containing Shrinkage Reducing Admixtures', ACI Spring Convention, Chicago, Illinois, (March 2010)

P12) Sant, G., 'Recent Advances in the Use of Organic Chemicals to Improve the Properties and Performance of Cementitious Materials', Invited Presentation at the State University of New York, Buffalo, New York, (March, 2010)

P13) Sant, G., 'Recent Advances in the Use of Organic Chemicals to Improve the Properties and Performance of Cementitious Materials', Invited Presentation at the University of California, Los Angeles, California (April, 2010)

P14) Sant, G., Lura, P., Scrivener, K. L., and Weiss, W. J., 'An Overview of the Mechanism of Shrinkage Reducing Admixtures in Mitigating Volume Changes in Fresh and Hardened Cementitious Systems at Early Ages', International RILEM Conference on the Use of

Superabsorbent Polymers and Other New Additives in Concrete, pp. 10, Technical University of Denmark, Lyngby, Denmark, (August, 2010)

P15) Sant, G., 'Shrinkage Reducing Admixtures: Smart Materials for Increasing the Service-Life of Concrete Infrastructure', Invited Seminar at Vanderbilt University, Nashville, Tennessee, (March 2011)

P16) Sant, G., Kumar, A., Sharma, V., Patapy, C., and Scrivener, K., 'The Influence of Alkali Hydroxides on Volume Changes in Cementitious Materials', ACI Spring Convention, Tampa, Florida, (April 2011)

P17) Sant, G., Lothenbach, B., Juilland, P., Lesaout, G., Weiss, W. J., and Scrivener, K. L., 'The Origin of Early-Age Expansions in Cementitious Materials Containing Shrinkage Reducing Admixtures', Invited Presentation at a Workshop on Expansive Reactions at the Oregon State University, Corvallis, OR, (July 2011)

P18) Sant, G., 'The Influence of Alkali Hydroxides on Volume Changes in Cementitious Materials', Invited Seminar at GeorgiaTech, Atlanta, Georgia, (August 2011)

P19) Sant, G., 'Green-Concrete: The Role of Computational Simulation for Materials Design and Optimization', Invited Presentation to the Technical Leadership of the Aditya Birla Science and Technology Company, Mumbai, India, (December 2011)

P20) Oey, T., Kumar, A., Bullard, J. W., Neithalath, N., and Sant, G., 'The Filler Effect: The Influence of Filler Volume and Surface Area on Cementitious Reaction Rates', 3rd Advances in Cement-based Materials: Characterization, Processing, Modeling and Sensing, Austin, Texas, (June 10–12, 2012)

P21) Sant, G., 'High Volume Limestone Binders: New Cementing Materials for Infrastructure Construction', Invited Presentation to AASHTO Subcommittee on Materials, Technical Session 3a: Hydraulic Cement and Lime, Biloxi, Mississippi, (August 2012)

P22) Sant, G., 'Innovative Strategies to Design Sustainable, Low-CO_2 Binders for Concrete Construction', Invited Presentation to the Strategic Development Council (SDC) of the American Concrete Institute, Quebec City, Canada, (September 2012)

P23) Sant, G., 'New Directions Towards High-Volume Cement Replacement using $CaCO_3$', Invited Seminar at the Department of Physics, MichiganTech, Houghton, Michigan, (October 2012)

P24) Sant, G., 'Quantum to Continuum: New Directions in Quantifying and Controlling the Reactivity of Cementing Materials', Invited Presentation to the Technical Leadership of Lafarge Central Research, Lyon, France, (October 2012)

P25) Sant, G., 'Means and Methodologies to Enable for High Volume Calcium Carbonate Replacement in Portland Cement Systems', Presentation to the Technical Leadership of Lafarge Central Research, UCLA, Los Angeles, CA, (February 2013)

P26) Sant, G., 'An Overview of Cementitious Materials Research at C&EE-UCLA', Invited Presentation to the Technical Leadership of KPFF Consulting Engineers, Newport Beach, CA, (February 2013)

P27) Sant, G., 'Water Sorption Isotherms: Directions towards Predicting Material Properties and Degradation Phenomena in Concrete', Invited Presentation at the FHWA-EAR Workshop on the Engineering Benefits of Multi-Scale Material Modeling, McLean, VA (April 2013)

P28) Sant, G., 'New Directions to Exploit and Optimize High Alumina Cements (HACs) in Construction', Invited Presentation to the Technical Leadership of Kerneos Aluminate Technologies, Lyon, France (May 2013)

P29) Sant, G., 'Strategies to Design Novel High Volume Limestone Binders for Concrete Construction', Invited Presentation to the ACI Chapter, Cleveland, OH, (May 2013)
P30) Sant, G. and Neithalath, N., 'Phase Change Materials: A New Strategy to Enhance the Thermal Cracking Resistance of Restrained Concrete Elements', Invited Presentation to the Research and Development Teams at BASF Construction Chemicals, Cleveland, OH, (May 2013)
P31) Oey, T., Kumar, A., Puerta Falla, G., Bullard, J. W., Neithalath, N., and Sant, G., 'New Directions towards Carbonate-Rich Cementing Systems', Invited Seminar at Georgia Tech, Atlanta, Georgia, (June 19, 2013)
P32) Oey, T., Kumar, A., Puerta Falla, G., Bullard, J. W., Neithalath, N., and Sant, G., 'Recent Research towards Carbonate-Rich Cementing Systems', 4th Advances in Cement-based Materials: Char., Processing, Modeling and Sensing, Urbana, IL, (July 8-10, 2013)
P33) Kumar, A., Reed, J., and Sant, G., 'Vertical Scanning Interferometry: A New Method to Study the Dissolution Dynamics of Cementing Materials', 4th Advances in Cement-based Materials: Characterization, Processing, Modeling and Sensing, Urbana, IL, (July 8-10, 2013)
P34) Kumar, A., Reed, J., and Sant, G., 'Vertical Scanning Interferometry: A New Method to Study the Dissolution Dynamics of Cementing Materials', Invited Presentation: 24th NIST Computer Modeling Workshop, National Institute of Standards and Technology, Gaithersburg, MD, (August 12-13, 2013)
P35) Balonis, M., Franke, W., Sant, G., 'The Influence of $Ca(NO_3)_2$ Additives on Phase Balances in 'Gypsum-free' Cementitious Materials: Thermodynamic Analyses for Optimizing Corrosion Inhibition', Invited Presentation: 3rd NitCal Symposium hosted by Yara International: San Sebastian, Spain, (November 5-7, 2013)
P36) Oey, T., Stoian, J. Li, J., Balonis, M., Kumar, A., Franke, W., Sant, G., 'Screening the Influences of $Ca(NO_3)_2$ on Reaction Evolution, Setting, Strength Gain in Cementitious Materials', Invited Presentation: 3rd NitCal Symposium hosted by Yara International: San Sebastian, Spain, (November 5-7, 2013)
P37) Sant, G., 'Quantum to Continuum: New Directions in Designing, Controlling and Enhancing the Performance of Cementitious Materials', Invited Presentation to the Leadership of TECNALIA Research and Innovation, Derio, Spain, (November 8, 2013)
P38) Sant, G., 'Inorganic Polymers: Novel Portland Cement Free Binders for Transportation Infrastructure', Invited Presentation at FHWA Workshop in Advances in Concrete Research: Turner-Fairbank Highway Res. Center (TFHRC), (December 3-4, 2013)
P39) Oey, T., Kumar, A., G. Puerta Falla, Bullard, J. W., Neithalath, N., and Sant, G., 'The Filler Effect: the Influence of Filler Content, Surface Area and Blending Methodologies on Cementitious Reaction Rates', International Conference in memory of R. N. Raikar on Advances in Cement-Based Materials, pp. 10, Mumbai, India, (20-22 December 2013)
P40) Kumar, A., Ketel, S., Oey, T., Vance, K., Neithalath, N., and Sant, G., 'Water Vapor Sorption in Cementitious Materials: Measurement, Modeling, Interpretation', Internat. Conference in memory of R. N. Raikar on Advances in Cement-Based Materials, pp. 9, Mumbai, India, (20-22 December 2013)
P41) Huang, J., Valenzano, L., Sant, G., 'The Influence of (Mg, Al, Fe) Impurities on triclinic Ca_3SiO_5: New Interpretations from DFT Calculations', 247th National Meeting of the American Chemical Society, pp. 10866, Dallas, Texas, (16-20 March 2014)

P42) Kumar, A., Reed, J., Sant, G., 'Vertical Scanning Interferometry (VSI): A New Method to Measure the Dissolution Dynamics of Cementitious Minerals', 247th National Meeting of the American Chemical Society, pp. 10866, Dallas, Texas, (16-20 March 2014)
P43) Kumar, A., Lewis, P., Bullard, J., Di Carlo, D., Sant, G., 'Inertial Microfluidics: Methods for Size-Based Classification of Inorganic Mineral Particles', 247th National Meeting of the American Chemical Society, pp. 10866, Dallas, Texas, (16-20 March 2014)
P44) Oey, T., Kumar, A., G. Puerta Falla, Bullard, J. W., Neithalath, N., and Sant, G., 'The Filler Effect: the Influence of Filler Content, Surface Area and Blending Methodologies on Cementitious Reaction Rates', Session on the Hydration of Low-Portland Cement Binders, Organized by: J. Bullard, K. Obla, G. Sant, ACI Spring Convention, Reno, NV (March 2014)
P45) Sant, G., 'How measurement and modeling can work "hand-in-hand" to quantify and manipulate reaction processes in cementing materials?', Invited Presentation at W. R. Grace: Construction Chemicals, Boston, MA (May 29, 2014)
P46) Sant, G., 'X-AFm Stabilization as a Means of Preventing Phase Conversion Phenomena in Calcium Aluminate Cements', Invited Presentation, EMPA: Swiss Federal Institute of Materials Science and Technology, Dubendorf, Switzerland (August 21, 2014)
P47) Sant, G., 'How Nanoscale Analytics Can Better Inform Long-Term Operation of Nuclear Structures: Case of Aggregate Degradation in Concrete', TINCE 2014: 2nd International Conference on Technological Innovations in Nuclear Civil Engineering, Paris, France (September 1-4, 2014)
P48) Stoian, J., Oey, T., Bullard, J. W., Huang, J., Kumar, A., Balonis, M., Terrill, J., Neithalath, N., and Sant, G., 'The Prehydration of Cement and its Mitigation: New Insights from Experiments and Simulations', 2nd International Congress on Durability of Concrete, New Delhi, India (December 4-6, 2014)
P49) Franke, W., Balonis-Sant, M., Oey, T., and Sant, G., 'The Fate of Nitrate Ions in Concrete under the Focus of Corrosion Inhibition', 2nd International Congress on Durability of Concrete, New Delhi, India (December 4-6, 2014)
P50) Sant, G. and Neithalath, N., 'Phase Change Materials: A New Strategy to Enhance the Thermal Cracking Resistance of Restrained Concrete Elements', 2nd International Congress on Durability of Concrete, New Delhi, India (December 4-6, 2014)
P51) Sant, G., 'Vertical Scanning Interferometry: A New Method to Quantify Solute-Solvent Reaction Dynamics in Cementitious Environments', Invited Presentation at TMS-Middle East: Mediterranean Materials Congress on Energy and Infrastructure Systems, Doha, Qatar, (January 11-14, 2015)
P52) Sant, G. et al., 'Inorganic Polymers: Novel Cement-Free Binders for Transportation Infrastructure', World of Coal Ash (WOCA) Conference, Nashville, TN, (May 4-7, 2015)
P53) Puerta-Falla, G., Balonis, M., Le Saout, G., Neithalath, N., Sant, G., 'The Influence of Metakaolin on Limestone Reactivity in Cementitious Materials' Calcined Clays for Sustainable Concrete, Lausanne, Switzerland, pp. 11-19, (June 22-25, 2015)
P54) Sant, G., 'A Figure of Merit for the Thermal Performance of Cementitious Composites Containing Phase Change Materials (PCMs)', Presentation at Session on: Methods for Measurement and Mitigation of Early-Age Deformations, ACI Fall Convention, Denver, CO, (November 8-11, 2015)
P55) Balonis, M., Falzone, G., Sant, G., 'X-AFm Stabilization: A Means for Bypassing Conversion Phenomena and Enhancing the Corrosion Resistance of Infrastructure',

Invited Presentation at PANalytical Building Materials Analysis (BMA) Workshop in Anaheim, California, USA, (June 14-17, 2015)

P56) Sant, G., 'The Influences of Neutron Irradiation on Aggregate Induced Degradation of Concrete', Invited Presentation at the Meeting of the International Committee on Irradiated Concrete (ICIC), Knoxville, TN, (November 2-5, 2015)

P57) Sant, G., 'New Insights into Prehydration of Cement and its Mitigation', Presentation at 14th International Congress on the Chemistry of Cement, Beijing, China, (October 13-16, 2015)

P58) Sant, G., 'Phase change materials (PCMs): A novel means to mitigate thermal cracking in restrained concrete elements', Presentation at 14th International Congress on the Chemistry of Cement, Beijing, China, (October 13-16, 2015)

P59) Sant, G., 'Phase Change Materials: An "Adaptive" Solution to Mitigate Thermal Cracking in Concrete Pavements', Invited Presentation at Chang'an University, School of Highway Engineering, Xi'an, China, (January 15, 2016)

P60) Sant, G., 'Understanding fly ash reactivity: A route to enhance its beneficial utilization in cementitious material applications', Invited Seminar at National Institute of Clean-and-Low-Carbon Energy (NiCE), Beijing, China, (January 17-19, 2016

P61) Sant, G., 'Direct observation of steel corrosion at nanoscale resolution using vertical scanning interferometry (VSI)', Invited Presentation at the ASD(R&E) Basic Research Forum organized by ASD(R&E) Basic Research Office, Arlington, VA, (September 8, 2016)

P62) Sant, G., 'Carbon Upcycling: Turning CO_2 into CO_2NCRETE', Invited Presentation at the 40th Technology Forum Organized by ACI's Strategic Development Council (SDC), Salt Lake City, UT, (September 9, 2016)

P63) Sant, G., 'Direct Experimental Evidence that Aggregate Dissolution is the Rate-Controlling Step in Alkali-Silica Reaction (ASR)', Invited Presentation at the TFHRC 3rd Bi-Annual Workshop on Alkali-Aggregate-Reaction and Alternative Cementitious Materials, McLean, VA, (September 7-8, 2016)

P64) Sant, G., 'Direct observation of steel corrosion at nanoscale resolution using vertical scanning interferometry (VSI)', Invited Presentation at NitCal Symposium, Strasbourg, France, (October 18-19, 2016)

P65) Sant, G., 'The Influences of Neutron Irradiation on Aggregate Induced Degradation of Concrete', Presentation at Session on Nanotechnology for Improved Concrete Performance, ACI Fall Convention, Philadelphia, PA, (October 23-26, 2016)

P66) Sant, G., 'Carbon Upcycling: Turning CO_2 into CO_2NCRETE', Invited Presentation at Session on Nanotechnology for Improved Concrete Performance, ACI Fall Convention, Philadelphia, PA, (October 23-26, 2016)

P67) Sant, G., 'A dissolution-precipitation mechanism is at the origin of concrete creep in moist environments', Invited Presentation at 2nd General Meeting of the International Committee on Irradiated Concrete, Nagoya, Japan, (November 6-10, 2016)

P68) Sant, G. 'Reactions at inorganic solid-liquid interfaces: New insights from the nanoscale of relevance to engineered, mineral and biological systems', Invited Presentation at School of Sustainable Engineering and the Built Environment, Arizona State University, Tempe, Arizona, (November 23, 2016)

P69) Sant, G., 'UCLA's Carbon Upcycling: Transforming building materials and concrete construction', Carbon XPRIZE Semi-Finalists Summit, New Orleans, Louisiana, (December 7-9, 2016)
P70) Sant, G. 'TRAnsforming CoNStruction by Carbon-Neutral CEmeNtation and Digital Fabrication (TRANSCEND)', Invited Presentation at the Advanced Research projects Agency-Energy, U.S. Department of Energy, Washington D.C. (January 9, 2017)
P71) Sant, G., 'Characterizing and modeling the effects of phase change materials (PCMs) on temperature rise in concrete pavements', EU-PAVE-Infravation Workshop, Brussels, Belgium, (March 23, 2017)
P72) Sant, G., 'Silicate dissolution behavior in cementitious environments: Rate controls and their implications on reactivity and durability', Invited Gustavo Colonnetti Medal Lecture, RILEM Spring Meeting, Detroit, Michigan, (March 29, 2017)
P73) Sant, G., 'Inorganic polymer binders (IPBs): Novel OPC-Free binders for transportation infrastructure', Technology Readiness Level (TRL) Assessment of FHWA-EAR Project (DTFH61-13-H-00011), Turner-Fairbank Highway Research Center, McLean, Virginia, (April 7, 2017)
P74) Sant, G., 'Upcycled "CO_2-negative" concrete for construction functions', Presentation at Kick-off Meeting at the National Energy Technology Laboratory (NETL), Pittsburgh, PA, (June 9, 2017)
P75) Sant, G., 'The origin of anomalous thermal expansion behavior in calcium-silicate-hydrates (C-S-H)', Presentation at International Conference on Advances in Construction Materials and Systems, Chennai, India, (September 10, 2017)
P76) Sant, G., 'Upcycled "CO_2-negative" concrete for construction functions', Presentation at Kick-off Meeting at the National Energy Technology Laboratory (NETL), Pittsburgh, PA, (June 9, 2017)
P77) Sant, G. 'TRAnsforming CoNStruction by Carbon-Neutral CEmeNtation and Digital Fabrication (TRANSCEND), Invited Presentation at Session on: Innovations in Concrete Technology, ACI Fall Convention, Anaheim, CA, (September 15, 2017)
P78) Sant, G. 'The construction sector as a gigaton sink for CO_2: Enabling scalable CO_2 utilization by (Ca, Mg) carbonate mineralization', Invited Presentation at the Advanced Research projects Agency-Energy (ARPA-E), U.S. Department of Energy, Washington D.C. (October 18, 2017)
P79) Sant, G. 'CO_2 upcycling by mineralization of a carbonate-based cementation material: Processing-property relationships of CO_2NCRETE™', Invited Presentation at the American Institute of Chemical Engineers, Annual Meeting, Session on CO_2 Use and Reuse, Minneapolis, MN, (October 30, 2017)
P80) Testimony to the U.S. House of Representatives, Committee on Science, Space and Technology, "Energy Innovation: Letting Technology Lead", Washington D.C., (July 19, 2017) [*https://science.house.gov/legislation/hearings/full-committee-hearing-energy-innovation-letting-technology-lead*]
P81) Sant, G. 'The Filler Effect (II): The Influence of Filler Content and Type on the Hydration Rate of Tricalcium Silicate', Presentation at Session on: Early-Age Property Development in Concrete With Supplementary Cementing Materials, ACI Fall Convention, Anaheim, CA, (September 15, 2017)

P82) Sant, G., 'The effects of irradiation on albite's chemical durability', Presentation at the 3rd Annual Meeting of the International Committee on Irradiated Concrete, Prague, Czech Republic, (November 6-10, 2017)
P83) Sant, G., 'An Overview of the TRANSCEND Consortium', Invited Presentation at the Mississippi Lime Company, St. Louis, MO, (February 23, 2018)
P84) Sant, G., 'Annual update on the COMAX Consortium', Invited Presentation at EPRI's Spring Meeting, P78 Advisors: Energy and Environment, Tampa, FL, (March 14, 2018)
P85) Sant, G., 'Cement-based materials: The challenge, and pathways to reduce their CO_2 intensity?', Invited Presentation at the Los Angeles Department of Water and Power's (LADWP): Green Team Meeting, Los Angeles, CA, (February 14, 2018)
P86) Sant, G., 'Translating pioneering research into civil engineering practice (and vice-versa) …', Invited Presentation at KPFF's Principals Meeting, Newport Beach, CA, (February 15-16, 2018)
P87) Sant, G., 'Revealing the role of atomic order-and-disorder on dissolution kinetics ("chemical reactivity") in aqueous environments', Invited Presentation at ARPA-E Workshop: Extremely Durable Cementitious Materials, Dallas, Texas, (April 10-11, 2018)
P88) Sant, G., 'The effects of irradiation on albite's chemical durability', Presentation at Technological Innovations in Nuclear Civil Engineering, Paris, France, (August 29-31, 2018)
P89) Sant, G., 'Silicate dissolution behavior in cementitious environments: Rate controls and their implications on reactivity and durability', Invited Presentation at Journal of the American Ceramic Society Awards Symposium, Materials Science and Technology 2018, Columbus, OH, (October 2018)
P90) Sant, G., 'Revealing the role of irradiation on dissolution kinetics ("chemical reactivity") of mineral aggregates in aqueous, high pH environments', Invited Presentation at International Committee on Irradiated Concrete, Annual Meeting, Knoxville, TN, (November 12-15, 2018)
P91) Sant, G. and Bullard, J. W., 'Consortium for: Design and Prediction of Concrete's Field Performance using Artificial Intelligence (DESIGN-AI)', Presentation at Electric Power Research Institute, Washington D.C., (February 1, 2019)
P92) Sant, G., 'Turning CO_2 into CO_2Concrete™', Invited Presentation at VerdeXchange, Los Angeles, CA, (January 2019)
P93) Sant, G., 'Isothermal Stimulation of Mineral Dissolution by Acoustic Perturbation', Invited Presentation at Missouri University of Science and Technology, Rolla, MO, (March 16, 2019)
P94) Sant, G., 'Turning CO_2 into CO_2Concrete™: Scalable mineralization offers gigaton opportunities for CO2 utilization by the construction sector', Invited Presentation at 12th Carbon Dioxide Utilization Summit, Houston, Texas, (February 27-28, 2019)
P95) Sant, G., 'Turning CO_2 into CO_2Concrete™: Scalable mineralization offers gigaton opportunities for CO2 utilization by the construction sector', Invited Presentation at U.S. Energy Association, Washington D.C., (March 5, 2019)
P96) Sant, G., 'Isothermal Stimulation of Mineral Dissolution by Acoustic Perturbation', Invited Presentation at IIT-Madras, Chennai, India, (April 10, 2019)

P97) Sant, G., 'Isothermal Stimulation of Mineral Dissolution by Acoustic Perturbation', Invited Presentation at Massachusetts Institute of Technology, Boston, MA, (May 2-3, 2019)
P98) Sant, G., 'Isothermal Stimulation of Mineral Dissolution by Acoustic Perturbation', Invited Presentation at National Institute of Standards and Technology, Boulder, CO, (May 16, 2019)
P99) Sant, G., 'How soluble (alkaline cation) salts mitigate alkali-silica reaction in concrete', Invited Presentation at U.S. Bureau of Reclamation, Boulder, CO, (May 17, 2019)
P100) Sant, G., 'Isothermal Stimulation of Mineral Dissolution by Acoustic Perturbation', Invited Presentation at Workshop on Science of Cement and Related Complex Materials, Donostia International Physics Center (DiPC), San Sebastian, Spain (July 15-18, 2019)

Reports and Other Publications:

- Ph.D. Dissertation: 'Fundamental Investigations Related to the Mitigation of Volume Changes in Cement-Based Materials at Early-Ages', pp. 201, Purdue University, West Lafayette, IN, (2009), Defense Examination Committee: J. Weiss, K. Scrivener, J. Olek, R. S. Govindaraju and D. Bentz
- M.S.C.E. Thesis: 'Examining Volume Changes, Stress Development and Cracking in Cement-Based Materials at Early-Ages', pp. 235, Purdue University, West Lafayette, IN, (2007), Examination Committee: J. Weiss, P. Lura, M. Dayananda, R. S. Govindaraju

University Service and Professional Activities and Service

1) UCLA, Samueli School of Engineering, Department of Civil and Environmental Engineering:
    - Space Committee (Chair: 2017-2018, Member: 2018-)
    - Chair, Merit Increase Committee (2015-2016, 2017-2018)
    - Member, Departmental Committee on Faculty Advancement (2016-)
    - Member, Departmental Standing Recruitment Committee (2016-)
    - Member, Departmental Student Awards Committee (2016-)
    - Departmental Faculty Search Committee (Member: 2013, Chair: 2017, 2018)
2) UCLA, Samueli School of Engineering: Faculty Executive Committee (Member, 2018-)
3) UCLA Academic Senate, Council on Research (CoR): Faculty Grants Program Committee (2018, 2019), Committee on Academic Freedom (2019-2022)
4) UCLA, Samueli School of Engineering: Member of the Organizing Committee: Tech Forum, (2012, 2015)
5) Participant of the ACBM-PCA Undergraduate Faculty Enhancement Workshop, (2007)
6) President and Vice-President: ACI Purdue University Student Chapter, (2006-2008)
7) National Effective Teaching Institute (NETI): Teaching Workshop, Miami, Florida, (2013)
8) ACI: Member, Past Chair of Task Group 4 (TG4) on Modeling and Simulation Methods under ACI Technical Activities Committee (TAC) 236: Materials Science of Concrete, Voting Member: TAC 231 (Properties of Concrete at Early Ages), TAC 236 (Materials Science of Concrete) and Associate Member: TAC 212 (Chemical Admixtures)

9) RILEM: Senior Member, Member of Technical Committee ISR (TC-ISR): Prognosis of deterioration and loss of serviceability in structures affected by alkali-silica reactions, Member ("Appointed Expert") of Technical Advisory Committee (TAC)
10) ASTM: Voting Member of ASTM C01 (Cement), C09 (Concrete), C01.10 (Hydraulic Cements), C01.23 (Compositional Analysis), C01.25 (Fineness), C01.26 (Heat of Hydration), C01.30 (Time of Set), C01.31 (Volume Change), C01.48 (Cementitious Materials and Admixtures), C01.96 (Cement/Concrete Reference Laboratory), C09.23 (Chemical Admixtures), C09.23.01 (Setting Time), C09.23.03 (Chemical Admixtures), C09.24 (Supplementary Cementitious Materials), C09.60 (Fresh Concrete), C09.64 (Nondestructive Testing), C09.66 (Concrete's Resistance to Fluid Penetration), C09.68 (Volume Change)
11) AASHTO: Friend of the Subcommittee on Materials (SOM): Technical Section 3(a): Hydraulic Cement and Lime
12) Expert Referee for: Cement and Concrete Research, RILEM: Materials and Structures, ASCE Journal of Materials in Civil Engineering, Cement and Concrete Composites, ACI Materials Journal, Journal of the American Ceramic Society, ASTM Journal of Testing and Evaluation, ASTM Advances in Civil Engineering Materials, Measurement, Construction and Building Materials, *PNAS*, Journal of Environmental Geotechnics, Science and Engineering of Composite Materials, International Journal of Concrete Structures and Materials, The ASCE Journal of Structural Engineering, Modeling and Simulation in Materials Science and Engineering, Materials Letters Blue (ML-Blue), Measurement Science and Technology, International Journal of Damage Mechanics, Materials Design, Chemistry of Materials, Environmental Science and Technology, Langmuir, Scientific Reports, Applied Energy, Crystal Growth and Design, Science Advances, Applied Thermal Engineering, Sustainable Chemistry and Engineering, Journal of Physical Chemistry, etc.
13) Grant Proposal Reviewer: Research Grants Council of Hong Kong, China, U.S. National Science Foundation, U.S. Environmental Protection Agency (SBIR Program), Chilean National Science and Technology Commission, U.S. Department of Energy, Swiss National Science Foundation (FNS), King Abdullah University of Science and Technology (KAUST): Competitive Research Grants Program
14) Participated in the overall development and validation of a test method for measuring autogenous deformations in cementitious systems. The method was adopted by ASTM as a standard (ASTM C1698, 2009). The method was reapproved in 2014.
15) Advisor: Student Chapter of American Society of Civil Engineers at UCLA, (2011-2012)
16) Technical Session Organization, Moderation and Panel Service: At meetings and workshops organized by: (a) American Concrete Institute, (b) American Ceramic Society, (c) ASCE's Engineering Mechanics Institute, (d) National Science Foundation, (e) Department of Energy, amongst others.
17) Member: of the International Organizing Committee, Inaugural R. N. Raikar Memorial International Conference, December 20-12, 2013, Mumbai, India
18) Editorial Board Member: Journal of Environmental Geotechnics (2013-2015)
19) Associate Editor: ASCE Journal of Materials in Civil Engineering (2013-)
20) Editorial Advisory Panel: Journal of Advances in Cement Research (2014-)
21) Review Editor: Frontiers in Materials: Journal of Structural Materials (2015-)
22) Editorial Board Member: Journal of Cement and Concrete Composites (2016-)

23) Associate Editor: Journal of Green Materials (2017-)
24) Associate Editor: RILEM's Journal of Materials and Structures (2017-)
25) Conference Chair: 1st International Conference on Grand Challenges in Construction Materials (IGCMAT 2016), Los Angeles, CA, (March 17-18, 2016)
26) Committee Member: National Academies of Science, Engineering and Medicine (NASEM): "Developing a Research Agenda for Utilization of Gaseous Carbon Waste Streams", (2017-2018) [*http://nas-sites.org/dels/studies/gcwu/*]