

CLAIRE WHITE

DETAILS

Address E-Quad, E-326
Princeton University
Princeton, NJ 08544, USA

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CURRENT EMPLOYMENT

Position Assistant Professor (August 2013 – present)
Department of Civil & Environmental Engineering, and
The Andlinger Center for Energy & the Environment
Princeton University

PREVIOUS EMPLOYMENT

Position Director's Postdoctoral Fellow (Dec 2011 – June 2013)
Lujan Neutron Scattering Center / Physics and Chemistry of Materials,
joint position
Los Alamos National Laboratory

Postdoctoral Research Associate (Nov 2010 – Nov 2011)
Lujan Neutron Scattering Center / Center for Nonlinear Studies, joint
position
Los Alamos National Laboratory

EDUCATIONAL BACKGROUND

2007 – 2010	Ph.D. candidate	Department of Chemical & Biomolecular Engineering, The University of Melbourne
Title	<i>Atomic structure evolution in amorphous geopolymer precursors and gels</i>	
	Supervisors	Professor Jannie S. J. van Deventer Dr John L. Provis Dr Daniel P. Riley

2002 – 2006	BE (Civil) (Hons.), (GPA 90/100)	The University of Melbourne
	BSc (Physics), (GPA 93/100)	The University of Melbourne

PEER REVIEWED JOURNAL PAPERS (LISTED IN CHRONOLOGICAL ORDER)

- (1) Provis JL, Gehman JD, White CE, Vlachos DG, *Modeling silica nanoparticle dissolution in TPAOH-TEOS-H₂O solutions*, *J. Phys. Chem. C*, **2008**, 112 (38) 14769-14775

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- (2) White CE, Provis JL, Riley DP, Kearley GJ, van Deventer JSJ, *What is the structure of kaolinite: Reconciling theory and experiment*, J. Phys. Chem. B, **2009**, 113 (19) 6756-6765
- (3) White CE, Provis JL, Proffen T, Riley DP, van Deventer JSJ, *Combining density functional theory (DFT) and pair distribution function (PDF) analysis to solve the structure of metastable materials: The case of metakaolin.*, Phys. Chem. Chem. Phys., **2010**, 12 (13) 3239-3245
- (4) White CE, Provis JL, Proffen T, Riley DP, van Deventer JSJ, *Density functional modeling of the local structure of kaolinite subjected to thermal dehydroxylation*, J. Phys. Chem. A, **2010**, 114 (14) 4988-4996
- (5) Wurden C, Page K, Llobet A, White CE, Proffen T, *Extracting differential pair distribution functions using MIXSCAT*, J. Appl. Cryst., **2010**, 43, 635-638
- (6) White CE, Provis JL, Proffen T, van Deventer JSJ, *The effects of temperature on the local structure of metakaolin-based geopolymer binder: a neutron pair distribution function investigation*, J Am. Ceram. Soc., **2010**, 93 (10) 3486-3492
- (7) White CE, Provis JL, Gordon LE, Riley DP, van Deventer JSJ, *Effect of temperature on the local structure of kaolinite intercalated with potassium acetate*, Chem. Mater., **2011**, 23 (2) 188-199
- (8) White CE, Provis JL, Kearley GJ, Riley DP, van Deventer JSJ, *Density functional modelling of silicate and aluminosilicate dimerisation solution chemistry* Dalton Trans., **2011** 40 (6) 1348-1355
- (9) White CE, Provis JL, Proffen T, van Deventer JSJ, *Quantitative mechanistic modeling of silica solubility and precipitation during the initial stages of zeolite synthesis*, J Phys. Chem. C, **2011** 115 (20) 9879-9888
- (10) Page K, White CE, Estell EG, Neder RB, Llobet A, Proffen T, *Treatment of hydrogen background in bulk and nanocrystalline neutron total scattering experiments*, J Appl. Crystallogr., **2011** 44 532-539
- (11) White CE, Provis JL, Llobet A, Proffen T, van Deventer JSJ, *Evolution of local structure in geopolymer gels: an in situ neutron pair distribution function analysis*, J Am. Ceram. Soc., **2011** 94 (10) 3532-3539
- (12) White CE, *Pair distribution function analysis of amorphous geopolymer precursors and binders: the importance of complementary simulations*, Zeitschrift für Kristallographie, **2012** 227 (5) 304-312
- (13) Provis JL, Myers RJ, White CE, Rose V, van Deventer JSJ, *X-ray microtomography shows pore structure and tortuosity in alkali-activated binders*, Cem. Concr. Res., **2012** 42 (6) 855-864
- (14) White CE, Provis JL, Proffen T, van Deventer JSJ, *Molecular mechanisms responsible for the structural changes occurring during geopolymerization: Multiscale simulation*, AICHE J., **2012** 58 (7) 2241-2253
- (15) Provis JL, Hajimohammadi A, White CE, Bernal SA, Myers RJ, Winarski RP, Rose V, Proffen T, Llobet A, van Deventer JSJ, *Nanostructural characterization of geopolymers by advanced beamline techniques*, Cem. Concr. Compos., **2013** 36 (1) 56-64

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- (16) White CE, Page K, Henson NJ, Provis JL, *In situ synchrotron X-ray pair distribution function analysis of the early stages of gel formation in metakaolin-based geopolymers*, Appl. Clay Sci., **2013** 73 (SI) 17-25
- (17) White CE, Page K, Henson NJ, Provis JL, *In situ X-ray pair distribution function analysis of geopolymer gel nanostructure formation kinetics*, Phys. Chem. Chem. Phys., **2013** 15 (22) 8573-8582
- (18) White CE, Kearley GJ, Provis JL, Riley DP, *Structure of kaolinite and influence of stacking faults: Reconciling theory and experiment using inelastic neutron scattering analysis*, J. Chem Phys., **2013** 138 (19) 194501

COMMENTS PUBLISHED ON PEER REVIEWED JOURNAL PAPERS

- (1) Provis JL, White CE, van Deventer JSJ, *Discussion of Y. Zhang et al., "Study of ion cluster reorientation process of geopolymerization reaction using semi-empirical AMI calculations," Cem Concr Res 39(12): 1174-1179; 2009. Cem. Concr. Res., **2010**, 40 (5) 827-828*
- (2) White CE, Perander LM, Provis JL, van Deventer JSJ, *The use of XANES to clarify issues related to bonding environments in metakaolin: a discussion of the paper S. Sperinck et al., "Dehydroxylation of kaolinite to metakaolin-a molecular dynamics study," J. Mater Chem., 2011, 21, 2118-2125 J Mater. Chem., **2011**, 21 (19) 7007-7010*
- (3) White CE, Provis JL, *Comment on "Structure-directing role of counterions in the initial stage of zeolite synthesis", J Phys. Chem. C, **2012** 116 (1) 1619-1621*

INVITED CONFERENCE PRESENTATIONS

- White CE, Amorphous materials: Potential avenues for uncovering their atomic structures, TMS 2013 Annual Meeting and Exhibition, San Antonio, USA, 3 - 7 March 2013
- White CE, Plenary presentation for receiving the 2012 Prize for Outstanding Student Research, American Conference on Neutron Scattering 2012, Washington DC, USA, 24 - 28 June 2012
- White CE, Provis JL, Proffen T, Riley DP, van Deventer JSJ, Coupling total scattering and density functional theory computations to solve the structure of complex disordered aluminosilicates, invited presentation at the American Crystallographic Association 2010 Annual Meeting, Chicago, USA, 24-29 June 2010
- van Deventer JSJ, White CE, Provis JL, The role of molecular research into the commercialization of geopolymer concrete in Australia, invited presentation at the 12th International Ceramics Congress of Cimtec 2010, Montecatini Terme, Italy, 6-11 June 2010

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CONFERENCE PRESENTATIONS (ORAL UNLESS NOTED)

- White CE, Provis JL, Riley DP, Proffen Th, Perander LM, van Deventer JSJ, Characterisation and description of the structure of metakaolin by total scattering, density functional theory, and X-ray spectroscopy, Concrete Repair, Rehabilitation and Retrofitting III - Proceedings of the 3rd International Conference on Concrete Repair, Rehabilitation and Retrofitting, ICCRRR 2012, **2012** 1426-1432 (Cape Town, South Africa, 3 - 5 September 2012)
- Provis JL, Hajimohammadi A, White CE, Bernal SA, Myers RJ, Winarski RP, Rose V, Proffen T, Llobet A, van Deventer JSJ, Nanostructural characterization of geopolymers by advanced beamline techniques, 4th International Symposium on Nanotechnology in Construction, Agios Nikolaos, Crete, Greece, 20 - 22 May 2012
- White CE, Bloomer B, Provis JL, Henson NJ, Page K, The synergy between total scattering and advanced simulation techniques: Quantifying geopolymer gel evolution, 4th International Symposium on Nanotechnology in Construction, Agios Nikolaos, Crete, Greece, 20 - 22 May 2012
- White CE, The PDF-DFT synergy for metastable materials: How to obtain structural representations that are energetically favorable, American Crystallographic Association meeting 2011, New Orleans, USA, 28 May - 2 June 2011
- White CE, The role of total scattering and multiscale modeling in the technological development of geopolymer concrete, American Crystallographic Association meeting 2011, New Orleans, USA, 28 May - 2 June 2011
- White CE, Provis JL, Henson NJ, Page K, Proffen T, van Deventer JSJ, Multiscale modeling of the structural mechanisms occurring during the formation of geopolymer binders: combining density functional theory and Monte Carlo analysis, poster presented at the American Crystallographic Association meeting 2011, New Orleans, USA, 28 May - 2 June 2011
- White CE, Provis JL, Proffen T, Riley DP, van Deventer JSJ, Solving the structure of amorphous aluminosilicates: understanding the chemistry of low-CO₂ geopolymer concrete, poster presented at LANSCE User Group Meeting, Santa Fe, USA, Sept 30 - Oct 1 2009
- White CE, Provis JL, Riley DP, Proffen T, van Deventer JSJ, Towards total structure solutions of disordered layered aluminosilicates, International Conference on Neutron Scattering 2009, Knoxville, USA, 3-7 May 2009.
- White CE, Provis JL, Riley DP, Proffen T, van Deventer JSJ, Structure of metakaolin from neutron pair distribution function analysis, 7th AINSE/ANBUG Neutron Science Symposium 2008, Lucas Heights, NSW, 8-10 Dec 2008.
- White CE, Provis JL, Riley DP, Proffen T, van Deventer JSJ, Towards the total structure solution of metakaolin, Materials Science & Technology Conference 2008, Pittsburgh, USA, 4-9 Oct 2008
- Duxson P, Gehman JD, White CE, Provis JL, Separovic F, Gan Z, van Deventer JSJ, ¹⁷O MQMAS NMR characterization of geopolymers, Chemeca 2007, Melbourne, Australia, 24-26 Sept 2007

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OTHER REPORTS/PRESENTATIONS

- White CE, Nanoengineering of Macroscale Materials, invited seminar at UT Knoxville, Tennessee, USA, May 2013
- White CE, Probing the local structural evolution of zeolites and cementitious materials using neutron total scattering and multiscale simulations, invited seminar at the Bragg Institute, Australian Nuclear Science and Technology Organisation, New South Wales, Australia, August 2011
- White CE, The synergy between total scattering and advanced simulation techniques in understanding complex, disordered and nanostructured materials, invited seminar at The University of Melbourne, Victoria, Australia, August 2011
- White CE, The role of molecular research in tailoring geopolymer durability, invited seminar at the Spallation Neutron Source, Oak Ridge National Laboratory, Tennessee, USA, July 2011
- White CE, The role of molecular research in tailoring geopolymer durability, postdoc talk at the Center for Nonlinear Studies, Los Alamos National Laboratory, New Mexico, USA, April 2011
- White CE, Provis JL, Proffen T, Riley DP, van Deventer JSJ, The PDF-DFT synergy for metastable materials: How to obtain structural representations that are energetically favorable, Invited lecture at *Applications of neutron scattering to materials and earth sciences* workshop, University of California, Berkeley, 11 December 2010.
- White CE, Provis JL, Proffen T, Riley DP, van Deventer JSJ, Towards total structure solutions of disordered layered aluminosilicates, Invited talk at the Lujan Neutron Scattering Center, Los Alamos National Laboratory, 23 June 2009.
- White CE, Provis JL, Proffen T, Riley DP, van Deventer JSJ, Towards total structure solutions of disordered layered aluminosilicates, Invited talk at the University of California, Berkeley, 15 May 2009.
- White CE, Provis JL, Riley DP, Proffen T, van Deventer JSJ, Towards the total structure solution of metakaolin, Invited talk at CNLS Los Alamos National Laboratory, 22 April 2009.

REVIEWER FOR ACADEMIC JOURNALS

- Langmuir, Journal of Physical Chemistry A/B/C/Letters, Journal of the American Ceramic Society, Cement and Concrete Research, Cement and Concrete Composites, Waste and Biomass Valorization, Applied Clay Science, Zeitschrift für Kristallographie, AIChE Journal, Journal of Materials Science, Crystal Growth & Design, Construction and Building Materials, Journal of Applied Crystallography

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ACADEMIC COMMUNITY INVOLVEMENT

- Vice-chair of the SNS-HFIR User Group, Oak Ridge National Laboratory, commenced July 2013.
- Principle organizer of the “Advanced Simulation Techniques for Total Scattering Data” workshop, to be held in Santa Fe, 16-19 October 2012.
- Lecturer at the New Mexico Supercomputing Challenge for high school students, Los Alamos National Laboratory, USA, 22-23 April 2012
- Lecturer at the 2011 LANSCE Neutron Scattering School, Los Alamos National Laboratory, USA, 18 July 2011
- Participated in Careers Fair for elementary students, organized by the American Association of University Women, Santa Fe, USA, May 2011
- Lecturer at the *Applications of neutron scattering to materials and earth sciences* workshop, UC Berkeley, USA, 11 December 2010
- Organized the first Australian workshop on “Total Scattering Analysis of Complex Materials Workshop”, The University of Melbourne, Australia, 12-13 August 2010.

SYNCHROTRON AND NEUTRON BEAM TIME AWARDED

- High-resolution powder diffractometer, Australian Synchrotron, Australia
- NPDF, HIPD, LQD, FDS Lujan Neutron Scattering Center, Los Alamos National Laboratory, USA
- ECHIDNA, OPAL Reactor, ANSTO, Australia
- TOSCA, ISIS, Rutherford Appleton Laboratory, UK
- 11-ID-B, Advanced Photon Source, Argonne National Laboratory, USA
- NOMAD, Spallation Neutron Source, Oak Ridge National Laboratory, USA

GRANTS, SCHOLARSHIPS AND PRIZES

Discovery Early Career Research Award (Australian Research Council)

- Announced as a recipient of a DECRA in November 2012.

Outstanding Student Research Prize 2012

- Awarded by the Neutron Scattering Society of America in recognition of outstanding accomplishment in the area of neutron scattering

Graduate Research Scholarships

- Australian Postgraduate Award to undertake higher research degree studies, 2007-2010
- CSRP (Centre for Sustainable Resource Processing) CRC top-up scholarship, 2007 - 2010

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Dean's Honours List (University of Melbourne)

- 2006 (Eng), 2005 (Eng), 2004 (Eng & Sci), 2003 (Eng & Sci), 2002

Academic Awards (University of Melbourne, 2002 – 2006)

- Argus Scholarship in Civil Engineering for highest academic performance in final year, 2006
- David Victor Isaacs Prize in Civil & Environmental Engineering (Final Year), awarded to the final year student who produces the most innovative and practical design in Civil Engineering, 2006
- Norman Westmore Prize in 421-439 Geotechnical Applications, 2006
- ASI Undergraduate Steel Design Award, 2005
- Fred Green Memorial Prize for highest academic performance, 2005
- John and Ann Gibson Prize, 2005
- AT Danks Exhibition in Structural Engineering, 2005
- Herbert Brooks Exhibition in Mechanics of Solids, 2004
- William Sutherland Prize in Physics 2, 2003
- Dean's Prize in Faculty of Science, 2002 (based on ENTER score, similar to GPA)