

## **CURRICULUM VITAE - William Peter (Billy) Boshoff**

**FULL NAMES** : William Peter Boshoff

**NATIONALITY** : South African

**DATE OF BIRTH** : 6 April 1979

**LANGUAGES** : English (Excellent)  
Afrikaans (Excellent)

**QUALIFICATIONS** : BEng (Civil) 2001 Stellenbosch University  
PhD (Civil Engineering) 2007 Stellenbosch University



### **RESEARCH INTERESTS:**

Fibre reinforced cement-based materials, from material to structural level.  
Time-dependant behaviour of cement-based materials, with special focus on creep and fatigue of cracked fibre reinforced concrete.  
Cracking of concrete, with a special interest in early age cracking.  
Eco Friendly Construction Materials, including earth masonry unit, alkali activated materials.  
Computational mechanics with special interest in numerical modelling of non-linear cement-based materials.

### **WORK EXPERIENCE:**

#### **Jan 2014 to present: Professor, Civil Engineering Department, Stellenbosch University.**

Undergraduate and Postgraduate teaching and curriculum development.  
Postgraduate supervision.  
Research in the field of construction materials, including sourcing of funding.  
Academic, administrative and financial management of research projects.  
Academic and departmental administration.  
Coordinator for the BEng (Civil) program (2014 and 2015), thus responsible for curriculum development and compliance with institution and ECSA requirements.  
Head of the Unit for Construction Materials (UCM) (2014 to present), responsible for the launch of the UCM, strategic planning and implementation, sourcing of funding, recruitment of postgraduate students, facilitating collaboration with local and international industry, managing the UCM team.

#### **Nov 2017 to present: Head of the newly founded Support Division of Civil Engineering**

Create and implement a new structure and systems/procedures required for the Support Division to function  
Day to day managing of the Support Division  
Line manager to 11 support staff  
Perform yearly performance appraisals

#### **Jan 2010 to Dec 2012, August 2013 to Dec 2016: Head: Division for Structural Engineering, Civil Engineering Department Stellenbosch University.**

Manage Division for Structural Engineering which consists of 19 permanent staff members (12 academic staff members) and normally around six temporary academic staff members.  
Member of Civil Engineering Department's executive committee.  
Coordinate Postgraduate Studies in the division.  
Responsible for strategic planning for the division, including staff, funding, laboratory and curriculum.

#### **Jul 2011 to Dec 2013: Associate Professor, Civil Engineering Department, Stellenbosch University.**

Undergraduate and Postgraduate teaching and curriculum development.  
Postgraduate supervision.  
Research in the field of construction materials, including sourcing of funding.  
Academic, administrative and financial management of research projects.  
Academic and departmental administration.

**Jan 2008 to June 2011: Senior Lecturer, Civil Engineering Department, Stellenbosch University.**

Undergraduate and Postgraduate teaching and curriculum development.

Postgraduate supervision.

Research in the field of construction materials, including sourcing of funding.

Academic and Departmental administration.

**Feb 2007 to Dec 2007 : Post Doctoral Fellow, Civil Engineering Department, Stellenbosch University.**

Responsible for the research group with regard to the advancement of cement-based materials, in particular SHCC (Strain Hardening Cement-based composites).

Guidance to Postgraduate students with regard to their research projects.

Responsible for initiating and sustaining international collaboration with regard to SHCC research. International partners are Dresden Technical University, Danish Technical University and Delft Technical University.

Responsible for teaching the concrete, masonry and timber part of the undergraduate Building Materials course.

Responsible for developing and teaching a course on experimental methods.

**Feb 2004 to Jan 2006 : Research assistant for the CDSI research group at the Structural Engineering Division, Civil Engineering Department, Stellenbosch University.**

Responsible for guidance of undergraduate and postgraduate students, design of test setups for the research group as well as specific research tasks.

**Jan 2004 to Dec 2006 : Manager of Structures Laboratory of Civil Engineering Department, Stellenbosch University.**

Responsible for the management of personnel, technical support for research, upgrading of instruments and testing equipment as well as performing commercial research.

Responsible for developing and teaching a course on experimental methods.

**2002 – BKS Consulting Engineers, Durban Office**

300 hour project for Toyota SA.

In depth investigations of the structural integrity of a 12 000 m<sup>2</sup> warehouse at the Toyota SA Plant in Durban.

The findings were detailed in a report.

**RESEARCH PROFILE:**

Google Scholar: H-index = 12, Citations = 501

Scopus: H-index = 11, Citations 277

Journal publications: 26 published (77 % in Q1)

Conference publications: 61 published, 3 accepted

Editor of Proceedings: 1

Chapters in Books: 2

South African National Research Foundation rating **Y2** 2011 - 2015

**CURRENT MEMBERSHIPS:**

Concrete Society of Southern Africa (Professional Voluntary Association of ECSA (Engineering Council of South Africa)) since 2004

South African Coal Ash Association Affiliates (SACAA) since 2018

Member of **fib** (International Federation for Structural Concrete) since 2012

Active member of RILEM (International Union of Laboratories and Experts in Construction Materials, Systems and Structures) since 2009

**COMMITTEES:**

Board member of the Concrete Society of Southern Africa, 2009 to present

President of the Concrete Society of Southern Africa, 2012 to 2014

Deputy of Delegation for the South African National Member Group of **fib**, 2013 to 2017

Head of Delegation for the South African National Member Group of **fib**, 2012

Chairman of Editorial Committee of CSSA and Editor in Chief of the DoHE accredited journal, Concrete Beton, 2010 to present

Member of Organising Committee of the 2012 Rilem Week in Cape Town

Member of Scientific Committee of International Conference BEFIB 2012 in Portugal

Member of Scientific Committee of the Fourth **fib** Congress 2014, Mumbai

Member of Scientific Committee ICCMATS 2014: International Conference on Construction Materials Engineering, Structural Performance and Durability (ICCMATS), Johannesburg, South Africa

Chairman of Organising Committee of the International Conference of Advanced Concrete Materials held Nov

2009 at Stellenbosch

- Member of the Scientific Committee for the 4<sup>th</sup> international conference on Concrete Repair, Rehabilitation and Retrofitting (ICCRRR) 2015, Leipzig, Germany
- Member of Scientific Committee for SFC 2016, Sustainable Futures Conference, Architecture and Construction In the Global South, Nairobi, Kenya, 2016
- Member of Scientific Committee of 9th RILEM International Symposium on Fiber Reinforced Concrete (BEFIB 2016), Vancouver, Canada
- RILEM Technical Committee 240 FDS, A framework for durability design of fibre reinforced strain hardening cement-based composites (SHCC), 2010 to present
- RILEM Technical Committee 260 RSC – Recommendations for use of superabsorbent polymers in concrete construction, 2014 to present
- RILEM Technical Committee 261 CCF – Creep behaviour of cracked sections of fibre reinforced concrete, 2014 to present
- Member of the Scientific Committee of the 2017 *fib* symposium: High Tech Concrete: Where technology and engineering meet!, Maastricht, The Netherlands
- Member of the Scientific Committee of The Fourth International Conference on Strain-hardening Cement-based Composites SHCC4 in 2017, Dresden, Germany
- Member of the Scientific Committee of the 5th International Conference on Concrete Repair, Rehabilitation and Retrofitting, Cape Town, South Africa, 2018
- Member of the Scientific Committee of the International Workshop on Durability and Sustainability of Concrete Structures (DSCS), Moscow, Russia 2018
- Member of the Scientific Committee of the *fib* Symposium 2019 Innovations in Materials, Design and Structures, Cracow, Poland, 2019
- Member of the Scientific Committee of the RILEM Spring Convention and International Conference on Sustainable Materials, Systems and Structures, SMSS 2019, Rovinj, Croatia, March 2019.
- Chairman of RILEM conference, 3rd International Conference on the Application of Superabsorbent Polymers (SAP) and Other New Admixtures Towards Smart Concrete, to be held in Kruger National Park, South Africa, November 2019

#### **TEACHING EXPERIENCE:**

- 2002 – 2006:** Teaching assistant for the following modules at Stellenbosch University: Informatics 244 (2002), Informatics 314 (2002), Strength of Materials 214 (2003-2004), Strength of Materials 244 (2003), Concrete Construction 344 (2005), Building Materials 254 (2004 - 2006)
- 2005 – 2008:** Structural Engineering Experimental Course, Stellenbosch University: Developing and teaching the course on undergraduate and postgraduate level
- 2007:** Building Materials 254, Stellenbosch University. Guest Lecturer at Holcim's Concrete Product Manufacturer's Conference
- 2008:** Theory of Structures 324, Building Materials 254, Stellenbosch University
- 2009:** Building Materials 254, Stellenbosch University. Guest Lectures, Technical University of Dresden, Germany
- 2010:** Theory of Structures 324, Building Materials 254, Strength of Materials 143, Stellenbosch University, Guest Lectures at University of Cape Town and Cement and Concrete Institute (ACT Course)
- 2011:** Theory of Structures 324, Building Materials 254, Stellenbosch University
- 2012:** Building Materials 254, Stellenbosch University
- 2013:** Building Materials 254, Strength of Materials 143, Stellenbosch University. Guest Lectures at University of Cape Town
- 2014:** Building Materials 254, Strength of Materials 143, Stellenbosch University, Postgraduate course on Cement-based Materials, Stellenbosch University, Guest Lectures at The Concrete Institute (ACT Course)
- 2015:** Building Materials 254, Strength of Materials 143, Stellenbosch University, Postgraduate course on Cement-based Materials, Stellenbosch University
- 2016:** Guest Lectures at The Concrete Institute (ACT Course), Postgraduate course on Cement-based Materials, Stellenbosch University, Strength of Materials 143, Stellenbosch University
- 2017:** Strength of Materials 143, Stellenbosch University
- 2018:** Postgraduate course on cement-based materials, Stellenbosch University, Strength of Materials 143, Stellenbosch University

#### **OTHER EXPERIENCE:**

- 2008 to present:** External examiner for numerous Master thesis
- 2008 to present:** Internal examiner for numerous Master theses and PhD dissertations
- 2008 to present:** Reviewed journal articles for ISI listed journals, including Cement and Concrete Composites, Cement and Concrete Research, Construction and Building Materials, amongst others.
- 2009 to present:** Reviewed international conference papers for 12 conferences

#### **SCHOLARSHIPS AND AWARDS:**

- 2001:** Prize for best project in Civil Engineering Informatics
- 2002 – 2003:** Stellenbosch University Postgraduate Merit Bursary
- 2002 – 2006:** Institute of Structural Engineering, Stellenbosch University – Scholarship for MSc and PhD studies
- 2004:** Ia-FraMCoS2004 Student Award of \$1000 to attend the Ia-FraMCoS 2004 conference in Vail, Colorado, USA. Awarded for “your accomplishments and your potential to contribute to the mission of Ia-FraMCoS”
- 2006:** DAAD scholarship for PhD research in Germany, Technical University of Kaiserslautern
- 2007:** Postdoctoral Fellowship, Stellenbosch University with title: *The design, characterisation and implementation of advanced cement-based composites in the South African Civil Engineering Industry*
- 2007:** Grant from Institute of Structural Engineering, Stellenbosch University for travelling to Europe for collaboration meetings with Dresden Technical University, Denmark Technical University and Delft Technical University
- 2007:** HL Reitz Medal for best postgraduate student in Civil Engineering, Stellenbosch University
- 2011:** Rector’s Award for General Performance
- 2012:** Rector’s Award for General Performance
- 2013:** Rector’s Award for General Performance
- 2014:** Upcoming Researcher of the Year, Faculty of Engineering, Stellenbosch University
- 2015:** Top 25 Young Researchers award at Stellenbosch University
- 2016:** Top 25 Young Researchers award at Stellenbosch University

#### **GRANTS AND PROJECT FUNDING: (£1 = R17)**

- 2009 - 2012:** South Africa / Germany bi-lateral funding from NRF and BMBF for R300 000 (£18 000) over three years. Topic: *Objective experimental and Numerical Modelling of SHCC*
- 2009 – 2011:** THRIP research project titled: *Application of Low Volume Fibre Reinforced Concrete*. Project awarded for three years with a total budget of R720 000 (£42 000) for three years
- 2011 – 2015:** NRF Incentive Funding, R100 000 (£6 000) over five years
- 2012 - 2014:** THRIP research project titled: *Structural Use of Synthetic Fibres in Concrete*. Project awarded for three years with a total budget of R960 000 (£56 000)
- 2013 - 2018:** Industry funded research project titled: *Research in the field of Construction Materials*. Total funding of R6 477 000 (£381 000) over six years
- 2013 – 2015:** Collaborator of Edulink project: Joint Development of Courses for Energy Efficient and Sustainable Housing in Africa. Total funding of 440 000 Euro
- 2014:** Industry project on fibre reinforced concrete, R200 000 (£12 000)
- 2015 – 2016:** Industry project on performance of fibre reinforced concrete. R360 000 (£21 000)
- 2015 – 2016:** Project on fibre reinforced concrete roads, R250 000 (£15 000)
- 2016 – 2017:** Industry project on design software for fibre reinforced concrete software, R515 000 (£30 000)
- 2016 - 2017:** Postdoctoral funding from Sub-Committee B of Stellenbosch University, R385 000 (£22 650)
- 2017 - 2018:** Newton Fund Award, United Kingdom for exchange of staff, £9 800
- 2017:** Erasmus + Staff Exchange Scholarship for visiting the University of Bologna for one week
- 2017:** Oppenheimer Memorial Trust grant for travelling in Europe as part of sabbatical, R50 000
- 2008 – Present:** Numerous other smaller projects, totalling around R550 000 (£32 000)

#### **Invited Presentations:**

- Fibre Reinforced Concrete*, October 2007, Concrete Product Manufacturer’s Conference, Organised by Holcim, Johannesburg, South Africa.
- Introduction to Fibre Reinforced Concrete*, October 2008, Monthly Technical Meeting of the Concrete Society of Southern Africa, Western Cape Branch.
- Fundamentals of Concrete Cracking and Non-Structural Cracking – Plastic Shrinkage and Settlement*, October 2012, ConCraX2012, Seminar of Concrete Society of Southern Africa, Johannesburg, Cape Town, Durban and Port Elizabeth, South Africa.
- Fundamentals of Concrete Cracking*, June 2013, Totally Concrete Expo, Sandton, South Africa.

- Understanding Fresh Concrete Behaviour*, December 2013, Faculty of Engineering Research Day, Stellenbosch University, South Africa.
- High Performance Concrete*, July 2014, Cape Town, Monthly Technical Meeting of the Concrete Society of Southern Africa, Western Cape Branch.
- Can Synthetic Fibres Save Concrete?* December 2014, Faculty of Engineering Research Day, Stellenbosch University, South Africa.
- Concrete: Friend or Foe?* March 2015, Inaugural Lecture, Stellenbosch University, South Africa.
- Concrete: Friend or Foe?* May 2015, Totally Concrete Expo, Sandton, South Africa.
- Concrete: Friend or Foe? A South African Perspective*, March 2016, Czech Technical University in Prague, Czech Republic.
- Fibre Reinforced Concrete: Can it solve your problem?* March 2017, University of Bath, United Kingdom
- Cracking of Concrete*, May 2017, University of Bologna, Italy
- Fibre reinforced concrete - from fundamental behaviour to structural design*, May 2017, University of Bologna, Italy

## **PUBLICATIONS:**

### **Dissertation:**

- Time-dependant behaviour of Engineered Cement-based Composites*. Dissertation, Stellenbosch University, 2007

### **Journal Publications:**

- WP Boshoff and GPAG Van Zijl, 2006. *Creep and Creep Fracture Engineered Cement-based Composites*, The International Journal of Restoration of Buildings and Monuments. Vol. 12, No. 2, pp 133–141.
- WP Boshoff and GPAG van Zijl, 2007, *Time-dependent response of ECC: Characterisation of creep and rate dependence*, Cement and Concrete Research, Vol 37, pp 725-734.
- WP Boshoff and GPAG van Zijl, 2007, *A computational model for strain-hardening fibre-reinforced cement-based composites*, Journal of the South African Institute of Civil Engineering, Vol. 49 No 2, pp 24–31.
- WP Boshoff, V Mechtcherine and GPAG van Zijl, 2009, *Characterising the time-dependant behaviour on the single fibre level of SHCC: Part 1: Mechanism of fibre pull-out creep*, Cement and Concrete Research, Vol 39, pp. 779–786.
- WP Boshoff, V Mechtcherine and GPAG van Zijl, 2009, *Characterising the time-dependant behaviour on the single fibre level of SHCC: Part 2: The rate effects on fibre pull-out tests*, Cement and Concrete Research, Vol. 39, pp 787–797.
- R Combrinck, WP Boshoff, 2012, *Investigation of Plastic Shrinkage Cracking in Conventional and Low Volume Fibre Reinforced Concrete*. Journal of the Concrete Society of Southern Africa, Concrete Beton, Vol 1.
- WP Boshoff, CJ Adendorff, 2013, *Effect of Sustained Loading on SHCC Crack Widths*, Cement and Concrete Composites, Vol 37, pp 119-125.
- WP Boshoff, R Combrinck, 2013, *Modelling the severity of plastic shrinkage cracking*, Cement and Concrete Research, Vol 48, pp 34-39.
- R Combrinck, WP Boshoff, 2013, *Typical plastic shrinkage cracking behaviour of concrete*, Magazine of Concrete Research, Vol 65 (8), pp 486-493.
- WP Boshoff, *Cracking behavior of SHCC subjected to sustained tensile loading*, 2014, ACI Materials Journal, Vol 111 (5), pp 553 – 560.
- J Vorel, WP Boshoff, 2014, *Numerical Simulation of Ductile Fiber-reinforced Cement-based Composite*, Journal of Computational and Applied Mathematics, Vol 270, pp 433-442.
- AJ Babafemi, WP Boshoff, 2015, *Tensile creep of macro-synthetic fibre reinforced concrete (MSFRC) under uni-axial tensile loading*, Cement and Concrete Composites, Vol 55, pp 62 – 69.
- J Vorel, WP Boshoff, 2015, *Computational modelling of real structures made of strain-hardening cement-based composites*, Applied Mathematics and Computation, Vol 267, pp 562-570
- A du Plessis, BJ Olawuyi, WP Boshoff, SG le Roux, 2016, *Simple and fast porosity analysis of concrete using X-ray computed tomography*, Materials and Structures, Vol 49, pp 553-562
- WP Boshoff, F Altmann, CJ Adendorff, V Mechtcherine, 2016, *A new approach for modelling the ingress of deleterious materials in cracked strain hardening cement-based composites*, Materials and Structures, Vol 49, pp 2285-2295
- AJ Babafemi, WP Boshoff, 2016, *Testing and modelling the creep of cracked macro-synthetic fibre reinforced concrete (MSFRC) under flexural loading*, Material and Structures, Vol 49, pp 4389-4400
- BJ Olawuyi, WP Boshoff, 2017, *Influence of SAP Content and Curing Age on Air Void Distribution of High Performance Concrete using 3D Volume Analysis*, Construction and Building Materials, Vol 135, pp 580-589

- AJ Babafemi, WP Boshoff, 2017, *Pull-out response of macro synthetic fibre from concrete matrix: effect of loading rate and embedment length*, Construction and Building Materials, Vol 135, pp 590-599
- PD Nieuwoudt, WP Boshoff, 2017, *Time-dependent Pull-out Behaviour of Hooked-end Steel Fibres in Concrete*, Cement and Concrete Composites, Vol 79, pp 133-147
- PD Nieuwoudt, AJ Babafemi, WP Boshoff, 2017, *The response of cracked steel fibre reinforced concrete under various sustained stress levels on both the macro and single fibre level*, Construction and Building Materials, Vol 156, pp 828-843
- AJ Babafemi, PD Nieuwoudt, WP Boshoff, 2017, *Comparative evaluation of the time-dependant deformations of cracked steel fibre and synthetic macro fibre reinforced concrete in tension*, Concrete Beton, Concrete Society of Southern Africa, No 151, pp 12-20
- CM Odendaal, AJ Babafemi, R Combrinck, WI de Villiers, WP Boshoff, 2018, *Evaluation of locally available synthetic macro fibres in a single fibre pull out test in concrete*, Journal of the South African Institute of Civil Engineering, Vol 60, pp 21 – 23.
- JO Lerch, HL Bester, AS van Rooyen, R Combrinck, WI de Villiers, WP Boshoff, 2018, *The effect of mixing on the performance of macro synthetic fibre reinforced concrete*, Cement and Concrete Research, Vol 103, pp 130-139.
- AJ Babafemi, A du Plessis, WP Boshoff, 2018, *Pull-out creep mechanism of synthetic macro fibres under a sustained load*, Construction and Building Materials, Vol 174, pp 466–473
- R Combrinck, L Steyl, WP Boshoff, 2018, *Influence of concrete depth and surface finishing on the cracking of plastic concrete*, Construction and Building Materials, Vol 175, pp 621–628
- R Combrinck, L Steyl, WP Boshoff, 2018 *Interaction between settlement and shrinkage cracking in plastic concrete*, Construction and Building Materials, Vol 185, pp 1-11

#### **Conference Papers:**

- WP Boshoff and GPAG Van Zijl, 2003. *Computational strategies for time-dependent behaviour of ECC*, Computational Modelling of Concrete Structures (eds. N Bicanic et al.), Proceedings for EURO-C 2003, pp 59-65. (Presented at the conference).
- WP Boshoff WP and GPAG van Zijl, 2004. *Computational and experimental modelling of creep behaviour of Engineered Cement-based Composites*, Published in the Proceedings of SEMC, Cape Town. (Presented at the conference).
- WP Boshoff and GPAG van Zijl, 2004. *Creep modelling of ductile fibre reinforced composites*, Published in the Proceedings of Fracture Mechanics of Concrete and Concrete Structures (FRAMCOS), Vale, U.S.A. (Presented at the Conference).
- WP Boshoff and GPAG van Zijl, 2005. *Time-dependant response of ECC: Characterisation and modelling of creep and creep fracture*, Proceedings of International workshop on HPFRCC in structural applications, Honolulu, Hawaii, USA. (Co-author presented at the conference).
- WP Boshoff and GPAG van Zijl 2007, *Mesh-Objectivity of Crack Modelling in SHCC*, International conference on the Nonlocal Modelling of Material's Failure, NMMF, Wuppertal. (Presented at the conference).
- WP Boshoff and GPAG van Zijl 2007, *Tensile Creep of SHCC*, International RILEM conference on High Performance fibre Reinforced Cement Composites, Mainz, Germany. (Co-author presented at the conference).
- WP Boshoff and GPAG van Zijl 2007, *Time-dependant behaviour of SHCC on the single fibre level*, Proceedings of the international conference, SEMC, Cape Town (Presented at the conference).
- Van Zijl, GPAG, Boshoff, WP 2008, *FRC in South Africa - application fields, new developments and outlook*, Proceedings of the international conference, ICCX 2008, Sun City, South Africa. (Co-author presented at the conference).
- WP Boshoff, CJ Adendorff, GPAG van Zijl, 2008, *Creep of Cracked Strain Hardening Cement-based Composites*, Proceedings of the international conference CONCREEP, Japan (Co-author presented at the conference).
- GPAG van Zijl and WP Boshoff, 2008, *Mechanisms of creep in fibre-reinforced Strain –Hardening Cement Composites (SHCC)*, Proceedings of the international conference CONCREEP, Japan. (Presented at the conference).
- CJ Adendorff, WP Boshoff, 2009, *Tensile Creep of Notched SHCC*, Proceedings of the International Conference CONMAT 2009, Japan. (Co-author presented at the conference).
- J Vorel, WP Boshoff, 2009, *Numerical Modelling of Strain Hardening Fibre-Reinforced Composites*, Proceedings of the International Conference ACM 2009, Stellenbosch. (Co-author presented at the conference).
- CJ Adendorff, WP Boshoff, GPAG van Zijl, 2009, *Characterisation of crack distribution of Strain-hardening cement composites (SHCC) under imposed strain*, Proceedings of the International Conference ACM 2009, Stellenbosch (Co-author presented at the conference).

- WP Boshoff, CJ Adendorff, 2010, *Modelling SHCC Cracking for Durability*, Proceedings of the European Conference on Fracture, Dresden, Germany. (Presented at the conference).
- C Brewis, WP Boshoff, 2010, *A holistic approach for measuring the environmental impact of the built environment*, CSE 2010 - Concrete for a Sustainable Environment, Emperor's Place, Kempton Park, South Africa (Co-author presented at the conference).
- R Combrinck, WP Boshoff, 2010 *Investigation of plastic shrinkage cracking in concrete*, 4th International Conference on Structural Engineering, Mechanics and Computation (SEMC 2010), Social Sciences Complex, University of Cape Town, Cape Town, South Africa. (Co-author presented at the conference).
- R Combrinck, WP Boshoff, 2011 *Investigation of the critical period for plastic shrinkage cracking*, FIB international workshop on performance based specifications for concrete, Leipzig, Germany. (Co-author presented at the conference).
- J Maritz, R Combrinck, WP Boshoff, 2011 *Investigation of the behaviour of low-volume fibre reinforced concrete in the fresh state*, FIB international workshop on performance based specifications for concrete, Leipzig, Germany (Co-author presented at the conference).
- WP Boshoff, 2011 *Performance based approach for modelling the cracking of SHCC for durability*, FIB international workshop on performance based specifications for concrete, Leipzig, Germany (Presented at the conference).
- W de Villiers, WP Boshoff, 2011, *The Development of a Decision-Making Model to Determine the Appropriateness of Alternative Building Technologies for Application in the Social Housing Industry*, International Conference, Exhibition and Housing Awards, South African Housing Foundation, Cape Town (Presented at the conference).
- WP Boshoff, PD Nieuwoudt, 2011, *Tensile Crack Widths of SHCC*, Second International Conference on Strain Hardening Cement-based Materials, SHCC2, Rio de Janeiro, Brazil (Presented at the conference).
- W.P. Boshoff, R. Combrinck, J. Maritz, 2012 *A model for the prediction of plastic shrinkage cracking in concrete*, Proceedings of the International Conference on Concrete Repair, Rehabilitation and Retrofitting, South Africa (Co-author presented at the conference).
- PD Nieuwoudt, WP Boshoff, 2012, *The comparison between the cracking behaviour of bending and tension for Strain Hardening Cement-based Composites (SHCC)*, Proceedings of ICCRRR, Cape Town, South Africa (Co-author presented at the conference).
- CJ Mouton, WP Boshoff, 2012, *Initial Study on the Tensile Creep of Cracked Fibre Reinforced Concrete*, Proceedings of BEFIB, Guimaraes, Portugal (Presented at the conference).
- R Combrinck, WP Boshoff, 2012, *Influence of restraint on the early age cracking of concrete*, Proceedings of BEFIB, Guimaraes, Portugal (Co-author presented at the conference).
- R Combrinck, WP Boshoff, 2012, *Theory for the early age plastic cracking behaviour of concrete*, fib PhD Symposium, Karlsruhe, Germany (Co-author presented at the conference).
- J Vorel, WP Boshoff, 2012, *Numerical Modelling of Engineered Cement-based Composites*. Proceedings of the International Conference of Engineered Mechanics, Svatka, Czech Republic (Co-author presented at the conference).
- WI de Villiers, WP Boshoff, 2012, *Regulation of Alternative Building Materials and Systems in South Africa*, International Conference, Exhibition and Housing Awards, South African Housing Foundation, Cape Town (Presented at the conference).
- BJ Olawuyi, WP Boshoff, 2013, *Influence of Particle Size Distribution on Compressive Strength and Elastic Modulus of High-Performance Concrete*, Proceedings of the International Conference ACCTA, Johannesburg, South Africa (Co-author presented at the conference).
- AJ Babafemi, WP Boshoff, 2013, *Preliminary creep behaviour of polypropylene fibre reinforced concrete (PPFRC) under a high tensile stress*, Proceedings of the International Conference ACCTA, Johannesburg, South Africa (Co-author presented at the conference).
- AJ Babafemi, WP Boshoff, 2013, *Time-dependent behaviour of pre-cracked polypropylene fibre reinforced concrete (PFRC) under sustained loading*. International Conference on Structural Engineering, Mechanics and Computation (SEMC 2013), Cape Town, South Africa (Co-author presented at the conference).
- G Coetsee, WP Boshoff, 2013, *Sisal reinforced cement-based masonry units*, . International Conference on Structural Engineering, Mechanics and Computation (SEMC 2013), Cape Town, South Africa (Co-author presented at the conference).
- BJ Olawuyi, WP Boshoff, 2013, *Compressive Strength of High-Performance Concrete with Absorption Capacity of Super-Absorbing-Polymers (SAP)*, International Conference on Structural Engineering, Mechanics and Computation (SEMC 2013), Cape Town, South Africa (Co-author presented at the conference).
- R Combrinck, WP Boshoff, 2013, *The origin of plastic settlement cracking and the effect of re-vibration*, International Conference on Structural Engineering, Mechanics and Computation (SEMC 2013), Cape Town, South Africa (Co-author presented at the conference).

- WP Boshoff, MD de Klerk, G Coetzee, WI de Villiers, RD Tolêdo Filho, 2013, *Alternative Materials for Masonry Units*, International housing conference, Exhibition and housing awards, Cape Town, South Africa (Presented at the conference).
- WI de Villiers, WP Boshoff, A van Noordwyk, C Brewis, J Brits, 2013, *Full Life Cycle Analysis of the Environmental Impact of Low-Cost Housing in South Africa*, International housing conference, Exhibition and housing awards, Cape Town, South Africa (Co-author presented at the conference).
- J Vorel, WP Boshoff, 2014, Numerical simulation of shear behaviour of SHCC elements, International Conference on Engineering Mechanics, Svatka, Czech Republic (Co-author presented at the conference).
- WI de Villiers, WP Boshoff, 2014, *3D modelling of alternative masonry walling for South African low-cost housing*, International Masonry Conference, Guimarães, Portugal (Did not attend conference due to unforeseen circumstances).
- BJ Olawuyi, WP Boshoff, 2014, *3D- Void analysis of high performance of concretes containing superabsorbent polymers (SAP)*. International RILEM Conference on Application of superabsorbent polymers and other new admixtures in concrete construction, Dresden, Germany (Co-author presented at the conference).
- JD Dippenaar, R Combrinck, WP Boshoff, 2014, *Initial Study to Determine the Tensile Material Properties of Fresh Concrete*, International Conference on Construction Materials and Structures, ICCMATS, Johannesburg, South Africa (Co-author presented at the conference).
- R Combrinck, WP Boshoff, 2014, *Fundamentals of Plastic Settlement Cracking*, International Conference on Construction Materials and Structures, ICCMATS, Johannesburg, South Africa (Co-author presented at the conference).
- AJ Babafemi, WP Boshoff, 2015, Crack Widening Response of Cracked Macro Synthetic FRC under Sustained Tensile Loading, The Fifth International Conference on Construction Materials: Performance, Innovations and Structural Implications, CONMAT'15, Whistler, Canada (Did not attend conference due to unforeseen circumstances).
- A van Noordwyk, WI de Villiers, WP Boshoff, 2015, Environmental Impact of Residential Building Envelope: A Comparison between Thermal Performance and Occupant Energy Usage, The Fifth International Conference on Construction Materials: Performance, Innovations and Structural Implications, CONMAT'15, Whistler, Canada (Co-author presented at the conference).
- BD le Roux, R Combrinck, WP Boshoff, 2015, Influence of Admixtures on Plastic Shrinkage Cracking of Concrete, The Fifth International Conference on Construction Materials: Performance, Innovations and Structural Implications, CONMAT'15, Whistler, Canada (Co-author presented at the conference).
- PD Nieuwoudt, WP Boshoff, 2015, Modelling the Time-dependent Pull-out behaviour of Hooked Steel Fibres, Concreep 10, Vienna, Austria
- AJ Babafemi, WP Boshoff, 2016, Macro-Synthetic fibre reinforced concrete: Creep and Creep Mechanisms, International RILEM Workshop on creep behaviour in cracked section of Fibre Reinforced Concrete, FRC Creep 2016, Valencia, Spain (Presented at the conference).
- WP Boshoff, PD Nieuwoudt, 2016, Tensile creep of cracked steel fibre reinforced concrete: mechanisms on the single fibre and at the macro level, International RILEM Workshop on creep behaviour in cracked section of Fibre Reinforced Concrete, FRC Creep 2016, Valencia, Spain (Presented at the conference).
- JP Louw, WP Boshoff, 2016, Mechanical Properties of Alkali Activated Materials for Construction, Sustainable Futures Conference, Nairobi, Kenya (Co-author presented at the conference).
- LM Pike, WP Boshoff, 2016, Processing Bagasse Ash for the South African Cement Industry, Sustainable Futures Conference, Nairobi, Kenya (Co-author presented at the conference).
- AJ Babafemi, WP Boshoff, 2016, Creep response of polypropylene macro fibre concrete under sustained flexural service loads, BEFIB 2016, 9th Rilem International Symposium on Fiber Reinforced Concrete, Vancouver, Canada (Co-author presented at the conference).
- JO Lerch, AS van Rooyen, WP Boshoff, 2016, The Influence of Mixing on the Single-Fibre Performance of Macro Synthetic Fibre Reinforced Concrete, BEFIB 2016, 9th Rilem International Symposium on Fiber Reinforced Concrete, Vancouver, Canada (Co-author presented at the conference).
- R Combrinck, WP Boshoff, 2016, Analytical Model of the Cracking of Plastic Concrete, *fib* Symposium 2016, Cape Town, South Africa (Co-author presented at the conference).
- L Steyl, R Combrinck, WP Boshoff, Proposed mould for the assessment of pure plastic shrinkage cracking, *fib* Symposium 2016, Cape Town, South Africa (Co-author presented at the conference).
- WP Boshoff, 2017, Keynote, Is your concrete wasteful or full of waste? KEYS conference, Johannesburg, South Africa
- BJ Olawuyi, WP Boshoff, 2017, Influence of Superabsorbent Polymers (SAP) on Fresh and Early-age Properties of High-Performance Concrete, 10th ACI/RILEM Intl Conference - ICCM2017, Montreal, Canada.
- AJ Babafemi, WP Boshoff, 2017, Pull-out phenomenon of synthetic macro fibres from a cementitious matrix, ICACMS, Chennai, India.



- WP Boshoff, HL Bester, C Viljoen, 2017, Initial study on determining the design values of macro synthetic FRC for floors on grade, ICACMS, Chennai, India.
- MY Khan, JT Kolawole, WP Boshoff and R Combrinck, 2017, Influence of relaxation and cyclic loading on the tensile material, 2nd International RILEM/COST Conference on Early Age Cracking and Serviceability in Cement-based Materials and Structures - EAC2, Brussels, Belgium
- R Combrinck, L Steyl, WP Boshoff, 2017, Influence of depth on the cracking of plastic concrete, 2nd International RILEM/COST Conference on Early Age Cracking and Serviceability in Cement-based Materials and Structures - EAC2, Brussels, Belgium
- GPAG van Zijl, WP Boshoff, 2017, The Effect of Crack Patterns on the Corrosion of Steel Reinforced SHCC, Strain Hardening Cement-based Composites (SHCC4), Dresden, Germany
- WI De Villiers, WP Boshoff, CL. Pagel, C Robins, B Potgieter, 2018, Thermal Testing of Alternative Masonry Walls, 10th International Masonry Conference, Milan, Italy
- M Diekmann, R Combrinck, WP Boshoff, 2018, Creating a low embodied carbon concrete with conventional concrete properties, 4th International Conference on Service Life Design for Infrastructures, Rilem Week 2018, Delft, The Netherland [Accepted]
- H Fataar, R Combrinck, WP Boshoff, 2018, Preliminary study on the single fibre pull-out fatigue resistance of fibre reinforced concrete, 4th International Conference on Service Life Design for Infrastructures, Rilem Week 2018, Delft, The Netherland [Accepted]
- WI de Villiers, J Fourie, WP Boshoff, 2018, Numerical Modelling of alternative masonry units, 4th International Conference on Service Life Design for Infrastructures, Rilem Week 2018, Delft, The Netherland [Accepted]

#### **Books and Book Chapters:**

- Advances of Cement-Based Materials*, proceeding of International Conference on Advanced Concrete Materials, Stellenbosch, South Africa 2010. Editors: WP Boshoff and GPAG van Zijl. Publishers: CRC Press.
- A Framework for Durability Design with Strain-hardening Cement-Based Composites (SHCC)*, Chapter 1 Introduction: Crack Distribution and Durability of SHCC, GPAG van Zijl, WP Boshoff, C Wagner and V Slowik, Editors: GPAG van Zijl and V Slowik, Springer, 2017
- A Framework for Durability Design with Strain-hardening Cement-Based Composites (SHCC)*, Chapter 2: Transfer of Fluids, Gases and Ions in and Through Cracked and Uncracked Composites, C Wagner, V Slowik, GPAG van Zijl, WP Boshoff, SC Paul, V Mechtcherine and K Kobayashi, Editors: GPAG van Zijl and V Slowik, Springer, 2017

#### **POST-DOCTORAL FELLOWSHIPS**

- Tensile creep of cracked fibre reinforced concrete*, Dr Adewumi J Babafemi, 1 May 2016 to 30 June 2017
- Plastic cracking of concrete*, Dr M Kayondo, 1 Dec 2017 to current

#### **POSTGRADUATE SUPERVISION:**

##### **Masters**

(2 years research)

- Christo Johan Adendorff** (MSc 2008 - 2009) The time dependant cracking behaviour of strain hardening cement-based composites.
- Riaan Combrinck** (MSc 2009 - 2010) Plastic shrinkage cracking in conventional and low volume fibre reinforced concrete.
- Christian Johannes Mouton** (MSc 2009-2011) Investigating the tensile creep of steel fibre reinforced concrete.
- Robert Jarrat** (MSc 2010-2011) Construction of insitu cast flat slabs using steel fibre reinforced concrete.
- Jaco-Louis Maritz** (MSc 2010-2011) An Investigation on the Use of Low Volume - Fibre Reinforced Concrete for Controlling Plastic Shrinkage Cracking.
- Arno Mohr** (MSc 2010-2011) Moment redistribution behaviour of SFRC members with varying fibre content.
- Pieter Nieuwoudt** (MSc 2010-2011) Quantifying the cracking behaviour of strain hardening cement-based composites.
- Chandre Brewis** (MSc 2010 - 2011) Quantifying the environmental dimension of sustainability for the built environment : with a focus on low cost housing in South Africa.
- Derick Wade Immelman** (MSc 2011-2012) The influence of percentage replacement on the aggregate and concrete properties from commercially produced coarse recycled concrete aggregate.

**Gerrit Coetzee** (MSc 2011-2012) The mechanical and volumetric behaviour of sisal fibre reinforced concrete blocks.

**Juane Brits** (MSc 2011-2012) Quantifying the sustainability of the built environment: Model for the determination for the environmental impact of the end of life phase.

**Daniel van der Westhuizen** ( MSc 2011 - 2013) Using Synthetic Fibres in Concrete to Control Drying Shrinkage Cracking in Concrete Slabs-on-Grade.

**Jacques Bothma** (MEng (Research) 2012 - 2013) The Structural Use of Synthetic Fibres: Thickness Design of Concrete Slabs on Grade.

**Courtney Megan Odendaal** (MEng (Research) 2013 - 2014) Establishment of Performance-Based Specifications for the Structural Use of Locally Available Macro-Synthetic Fibres.

**Ryno Barnard** (MEng (Research) 2013 - 2014) Mechanical properties of fly ash/slag based geopolymer concrete with the addition of macro fibres.

**Marthinus Dawid de Klerk** (MEng (Research) 2013 - 2015) The Durability of Natural Sisal Fibre Reinforced Cement-based Composites.

**Diederick Dippenaar** (MEng (Research) 2013 - 2015) The tensile properties of early age concrete and the experimental apparatus required for its determination.

**Louise du Plessis** (MEng (Research) 2013 - 2015) The effect of macro-synthetic fibres on the drying shrinkage cracking behaviour of concrete slabs on grade.

**Danielle Malherbe** (MEng (Research) 2014 - 2016) The Characterisation of Compressed Earth Blocks Stabilised with Cement and Agro-industrial Residues.

**Jean Oliver Lerch** (MEng (Research) 2014 - 2016) Investigation into the Effect of Fibre Geometry on the Performance of Macro Synthetic Fibre Reinforced Concrete.

**Vital Alexander** (MEng (Research) 2014 - 2016) The performance of locally produced supplementary cementitious materials when incorporated in concrete.

**Nuraan Ebrahim** (MEng (Research) 2014 - 2016) Using Superabsorbent polymers in high performance concrete to mitigate autogenous and plastic shrinkage while observing compressive strength.

**Joachim P Louw** (MEng (Research) 2015 - 2017) The structural use of alkali activated materials.

**Hermanus L Bester** (MEng (Research) 2015 - 2017) Generic model for predicting the performance of macro-synthetic fibre reinforced concrete for industrial flooring applications

**Leo M Pike** (MEng (Research) 2016 - 2017) Creep of cracked fibre reinforced concrete.

**Fred Mudge** (MEng (Research) 2016 - 2018) Design using fibre reinforced concrete.

**Humarai Fataar** (MEng (Research) 2017 - ) The fatigue behaviour of FRC.

**Michael Diekman** (MEng (Research) 2017 - ) Designing eco-friendly concrete.

**Divan Visser** (MEng 2018 (Research) - ) Shear behaviour of fabric formed concrete beams.

**PhD**

**AJ Babafemi** (2011 - 2015) Tensile creep of cracked macro synthetic fibre reinforced concrete.

**BJ Olawuyi** (2012 - 2016) Understanding the Mechanical Behaviour of High Performance Concrete with Superabsorbent Polymer (SAP).

**Riaan Combrinck** ( 2011 - 2016) Modelling the cracking behaviour of fresh concrete using numerical methods.

**Pieter Daniel Nieuwoudt** (2012 - 2016) Time-dependant Behaviour of Cracked Steel Fibre Reinforced Concrete.

**Wibke Irmtraut de Villiers** (2012 - ) Development of a Decision-Making Model to Determine the Sustainability and Structural Suitability of Alternative Building Technologies for Implementation in the Social Housing Industry.

**John T Kolawole** (2017 - ) The link between rheology and plastic cracking

**Vital Alexander** (2018 - ) Tensile Creep of Cracked Textile Reinforced Concrete

**DEng**

**GPAG van Zijl** (2016) Contributions to structural mechanics and durability in structural engineering.

**SELECTED COMMERCIAL RESEARCH PROJECTS:**

**2004: Consani Engineering: Testing of corner posts for freight containers.** A number of corner posts for freight containers were tested with different thicknesses to obtain the most economical design.

- 2004: BKS Consulting Engineers: Testing of masonry walls of new student residence of University of Stellenbosch.** Samples of masonry walls of the new student residence at Stellenbosch University were taken and tested. Results were compared to reference masonry walls to report on quality of masonry units, mortar and building quality.
- 2004 : Photego: Testing of in-situ strain measuring instruments for strain determination in concrete beams.** In-situ strain measuring instrument were cast in position in reinforced concrete beams. The readings were compared to the strain readings of strain gauges glued to the reinforcing while the beam was tested in flexure.
- 2004/5 : Zietsman Lloyd and Hemsted (PTY) LTD: Testing of repair methods for a large concrete channel.** Different repair method were tested which included glued laminates on concrete beams, laminate material testing and full scale tests of channel sections retrofitted with bonded laminates and Kevlar anchors.
- 2004-2008 : Managing the commercial testing service of Concrete Laboratory, Stellenbosch University.** Managed the testing, reporting, invoicing and client liaison for the commercial service of the Concrete Laboratory, Stellenbosch University. Over 30 clients used this service during the period from 2004 to 2007.
- 2005 : Peri Wiehahn (PTY) LTD : Testing of extensions fitted to props.** Props were tested to find to the reduction of capacity due to a fitted extension.
- 2006 : BVi Consulting : Material testing of anchorage bolts.** Tensile testing of the steel quality of anchorage bolts.
- 2007 : Hosaf Fibres : Investigation the effectiveness of Poly-Ester fibres as secondary reinforcing in concrete.** Poly-Ester fibres manufactured by Hosaf Fibres were investigated for the possible application as secondary reinforcing in concrete. Different fibre types were investigated. The effectiveness of the fibres was also compared to fibres available in the South African market.
- 2008 : A Precast Concrete Company : Developing a Fibre Reinforced Concrete for specific applications.** A Fibre Reinforced concrete was developed, optimised and tested for specific applications for a precast concrete company.
- 2008 : Hosaf Fibres : Investigation the effectiveness of Poly-Ester fibres for increasing the impact resistance of concrete.** The effectiveness of Poly-Ester fibres manufactured by Hosaf Fibres for increasing the impact resistance of concrete was investigated.
- 2009 : Hosaf Fibres : Investigation the effectiveness of Poly-Ester fibres for increasing the resistance of plastic shrinkage cracking. A report for Agreement certification** The effectiveness of Poly-Ester fibres manufactured by Hosaf Fibres for increasing the resistance of plastic shrinkage cracking. The report was compiled for the certification of Hosaf Fibres by Agreement.
- 2009 : A Precast Concrete Company : Evaluation of a precast flooring system according to SANS standards.** A precast flooring system was evaluated to determine whether the system complies to SANS standards.
- 2010 : Precast Company : Development of FRC and manufacturing process for precast company.** A high strength fibre reinforced concrete mix was developed for precast concrete units. The mix was adjusted to be compatible with a specific manufacturing process.
- 2012 : Contractor : Investigation into the cracking of concrete pavements.** A concrete pavement showed significant cracking. Causes and prevention methods were investigated.
- 2013 : Manufacturer :** Testing of mechanical properties and durability of glass fibre reinforced cement-based material.
- 2014 : Consulting Engineer :** Testing of balustrade.
- 2014 : Mining Company :** Testing of materials to be used as supplementary cementitious materials.
- 2015/6 : Local contractor :** Fatigue and other testing of fibre reinforced concrete for a pavement application.
- 2016 : Formwork supplier :** Testing of temporary support towers up to 10 meters for resisting service loads.