

PROF.DR.DR. BRUCE W. WATSON

EXPERTISE & INTERESTS

My expertise areas include:

- Cyber security, intelligence analysis and cyberwarfare
- Decision making & support and knowledge dynamics
- Systems thinking and evaluation
- Big data and data-science
- Algorithmics and high-performance computing

PROFESSIONAL EXPERIENCE

2010 – Present Stellenbosch University Stellenbosch, South Africa
Full Professor of Information Science and Knowledge Dynamics & Decision Making

- Research, management and consulting in cyber security & cyber intelligence analysis (network, system, cyberdefense, cyberwarfare, etc.), high performance computing, and big data analytics.
- Co-director of the Centre for Artificial Intelligence Research, focused on knowledge acquisition & representation, and intelligent systems.
- Director of the Centre for Knowledge Dynamics & Decision Making.

2013 – Present King's College London London, UK
Visiting (non-resident) Full Professor of Algorithmics

2008 – 2013 ASML & Brion Corp. Veldhoven, NL and Santa Clara, US
Sr. Manager for Advanced Software Technology

- Initiate and lead company-wide (touching >2000 engineers distributed globally) model-based engineering (MBE) — with 100's of models using new high-performance algorithms implemented in C++ and FPGAs, MBE gives ASML an seven-\$-digit/year savings as well as significant quality impact on customers (*all* leading silicon chip makers).

2005 – 2008 Sagantec Inc. Fremont, US and Eindhoven, NL
Chief Technical Officer (CTO) and Technical Architect

- Architected, road-mapped and oversaw advanced implementations of Sagantec's EDA software for pattern-based optimization of silicon chips. Brought the vision and the value-proposition to key customers (*all* leading chip companies).

2000 – 2004 Cisco Systems (Security) Austin, US
Pattern Matching Implementation Consultant & Algorithmics Specialist

- Led R, D & E of new pattern matching algorithms and data-structures that became the key enablers in a new generation of network intrusion detectors and deep packet-inspectors.

2001 – 2005 Eindhoven University of Technology Eindhoven, NL
Full Professor of Software Construction and Engineering (Head of Department)

- Headed a highly successful department working on applied and theoretical research into advanced computing and modern software/hardware co-engineering.

1998 – 2011 University of Pretoria Pretoria, South Africa
Full Professor (until 2005, thereafter 'Extraordinary Professor') of Computer Science

1996 – 2000 Ribbit Software Systems Inc. Kelowna, Canada
Co-founder and Chief Architect

- R, D & E of successful *High-speed Search Framework* and *Java/JavaScript Virtual Machine* technologies, licensed as key technology to companies, including Novell and WordPerfect.

- 1995 – 1996 Visual Edge Software Ltd. Montreal, Canada
Chief Architect & Implementation Lead for Programming Languages
 • Architected languages, compilers, interpreters and virtual machines for C++ and Object Basic (IBM's VisualAge for ObjectBasic — compatible with Microsoft's VB and VBScript).
- 1991 – 1995 Eindhoven University of Technology Eindhoven, NL
Research (Ph.D) Fellowship in the Program Implementation (Compiler) Group
- 1989 – 1990 Microsoft Corp. Redmond, US
Software (Compiler) Engineer in the Advanced Compiler Group
 • Algorithmic R, D & E for code generators and machine-independent global optimizers supporting the cross-platform and first releases of Windows NT. I left for graduate school.
- 1988 – 1989 Computer Systems Group / Watcom Waterloo, Canada
Software (Compiler) Engineer in Compiler Group
 • R, D & E in the highly successful C, C++, F77 X-compiler technologies for IA32, S/370 etc.

EDUCATION

- 1991 – 1995 Eindhoven University of Technology Eindhoven, NL
Doctorate degree (Ph.D) in Computing Science & Computer Engineering
 • Developed fundamentally new algorithms (taxonomically) and implementations for pattern matching and implementing/optimizing regular expressions and automata. The dissertation remains the core reference work on such algorithms.
- 2002 – 2010 University of Pretoria Pretoria, South Africa
Doctorate degree (Ph.D) in Computer Science
 • Formally derived entirely new (and also existing) algorithms for building minimal string-set graphs, with applications such as computational linguistics, security, analytics, etc.
- 2003 De Baak Management Institute Driebergen, NL
Executive & Academic Program in Management & Leadership in the Knowledge Economy
- 1985 – 1991 (split) University of Waterloo Waterloo, Canada
Honours Joint Bachelor of Math in Computer Science and Combinatorics & Optimization

CONTACT DATA

Cell:

INTERESTS & ACTIVITIES

- Flying (powered aircraft and gliders), motorcycling, tennis, wine-collecting, cycling, ...