

# *curriculum vitae* Dr. Michael K. Bane

## Current Positions

### **Founder, High End Compute Ltd** (Incorporated January 2017)

Michael started the “High End Compute” consultancy ball rolling back in Spring 2013 and incorporated in January 2017. HEC aims to engage SMEs in emerging technology/techniques with a focus on low energy computing, via workshops/training and the philosophy of passing on the skills via hands-on examples with real life code/data. Recent commissions include design & delivery of training on “How to do Parallel” for National Environmental Research Council postgraduates, production of a training video on OpenMP and VTune (profiler) for Intel via a third party, and design & delivery of the relevance of high end computing to school children. <https://highendcompute.co.uk>

### **Chair, EMiT Organising Committee**

Michael set up the EMerging Tech (techniques/technologies) international conference series and was Chair of the Organising Committee for #EMiT2016 hosted at Barcelona Supercomputing Centre. <http://emit.tech>

### **Research Scientist, Energy Efficient Computing group, Hartree Centre** (part time, Feb 2016, fixed term)

Hartree PI for the TSERO (Total Software Energy Reporting & Optimisation) project; building collaborations between Hartree and vendors; exploring methodologies for hierarchical power & energy measurements; researching avenues for reducing energy to solution (without adverse increase in time to solution).

## International Awards

2009/10: National Environmental Hero: UK Universities’ Green Impact award

2008: Best Paper award for “Development and illustrative outputs of the Community Integrated Assessment System (CIAS), a multi-institutional modular integrated assessment approach for modelling climate change”: paper was selected by the Editors, with support from the Board members, as the best paper published in EMS in 2008 under the 'Decision Support' category.

2006: Community Modeling and Analysis Systems (CMAS) Award "to recognize your outstanding achievements in advancing and promoting the ideals of the community modelling paradigm".

## Formal Training Qualifications

Prince 2 Practitioner; ITIL v3 Foundation; Green IT Foundation

## Relevant Recent Professional Experience

**Member of UoM General Assembly** (Sept. 2011 – Summer 2014)

**Secretary, UoM Computational Operations Team** (2011-2013)

**Chair, UoM Bicycle Users’ Group** (2010 – Feb 2016)

**Communications Officer, HPC SIG** (Summer 2012 – December 2013)

### **Manager, Research Apps, IT Services, Univ. of Manchester** (Dec 2014 – Feb 2016)

Manager responsible for support of wide portfolio of research applications available to 10,000 researchers at The University of Manchester. Michael brought together two sets of people to form a highly functional new team that supported researchers in their computational and data requirements, from desktop to supercomputers, across a range of programming languages, IDEs and software development tools in both traditional fields of compute/data but also emerging arenas such as many-core, FPGA, ML, heterogenous architectures and energy efficient computing. Michael’s remit also included the development of the Research Computing Training Service and of Research Data Management before his resignation in order to devote time to his “High End Compute” consultancy

**Senior Research Applications & Collaboration Consultant, IT Services,****Univ. of Manchester** (Dec 2008 – Nov 2014)

Providing strategic direction and expert support to University of Manchester (UoM) and N8 researchers in the fields of research computing (comprising high end compute, research data management and emerging technologies for computation and informatics) via in-depth support and training. Michael co-ordinated UoM's Research Computing Training Service and maintained the UNIX, MPI, OpenMP and GPU blended training courses. Michael initiated the UoM GPU Club in Nov2010 to identify & track emerging computational technologies (hardware, software & algorithms) for potential use to maximise research. Michael's instrumental role at UoM has built long term relationships with vendors (including Intel & NVIDIA) resulting in award of NVIDIA CUDA Research Centre. Michael was responsible for the team's support model, managed various projects, oversaw moves to better interrogate the University's assorted research management systems, and mentored UoM staff. He is named/involved on a variety of research proposals and awards, including NERC GPU, EPS KTA & EPSRC HECToR GPU Testbed along with outreach/STEM innovation awards.

**PDRA, Centre for Atmospheric Science, SEAES, Univ. of Manchester** (Aug. 2004 – Nov. 2008)

Improving the CMAQ Models-3 package, including its numerical and aerosol processes, for modelling aerosol transport in the United Kingdom, including beta tester for "CMAQ Unified" bundles and its meteorological preprocessor, MCIP (for processing data from running MM5, a predecessor to WRF) and have worked with the UM and its UM-to-MCIP processor. Referee for ACPD journal.

**Research Associate, Centre for Novel Computing,****Computer Science, University of Manchester.** (Jan. 2000 – July 2004)

A mix of research and project work including: working on Tyndall Centre's flagship project (softIAM) to provide a community integrated assessment system for improving the understanding of climate change, by writing & implementing a portable, flexible framework for coupling remote models (monetary drivers, GCMs, impact models); undertaking optimization of Southampton Oceanographic Centre's "occam" sea model - a large parallel (MPI) high resolution model of the world's oceans; named researcher on EPSRC-funded "Ovaltine" project to develop proof of concept for a tool to support automatic parallelisation of OpenMP codes; coding projects for National Office of Statistics and Univ. of Manchester Mobile Systems Architecture; refereed papers EuroPar 2001 & 2002, EuropeanAcrossGrids, compFrame2003 and SuperComputing 2003; gave invited presentations at EuroPar 2002 and 6<sup>th</sup> European SGI/Cray MPP Workshop (2000).

**HPC Applications Support, Manchester Computing/CSAR, Univ. of Manchester.** (Aug98–Dec99)

Undertook in-depth support for users of the CSAR supercomputers and local HPC users, particularly on shared memory SGI Origin and Cray MPP systems, with particular reference to single node optimisation, improving parallel performance and performance analysis; developing and delivering training on optimisation and parallelisation for the Origin2000, including writing a new OpenMP course and delivering a 3-day bespoke course for the University of Leicester.

## Selected Publications

David Topping, Irfan Alibay, and **Michael Bane**, "Accelerating activity coefficient calculations using multicore platforms, and profiling the energy use resulting from such calculations", EGU2017-12246

N. Di Pasquale, **M. Bane**, S.J. Davie and P.L.A. Popelier (2016), "FEREBUS: Highly Parallelized Engine for Kriging Training", J. Comput. Chem., vol. 37, 2606-2616.

"Proceedings of the EMerging Technology (EMiT) Conference 2016", Editors: B.D.Rogers, D.Topping, F. Mantovani, **M.K.Bane**. ISBN 978-0-9933426-3-9.

D.O. Topping, M. Barley, **M. Bane**, N.J. Higham, B. Aumont, and G. McFiggans (2016), "UManSysProp: An online facility for molecular property prediction and atmospheric aerosol calculations", Geosci. Model. Dev. 9, pp899-914.

"Proceedings of the Emerging Technology (EMiT) Conference 2015", Editors: B.D.Rogers, D.Topping, **M.K.Bane**. ISBN 978-0-9933426-0-8.

R. Warren, S. de la Nava Santos, N.W. Arnell, **M. Bane**, T. Barker, C. Barton et al (2008), "Development and illustrative outputs of the Community Integrated Assessment System (CIAS), a multi-institutional modular integrated assessment approach for modelling climate change", Environmental Modelling & Software, Volume 23, Issue 5, May 2008, pp592-610.

R.W. Ford, G.D. Riley, M.K. **Bane**, C.W. Armstrong and T.L. Freeman (2006), "GCF: a General Coupling Framework", Concurrency and Computation: Practice & Experience (John Wiley & Sons), vol. 18, no. 2, pp163-181, 2006.

Elliot, M. J., Manning, A., Mayes, K., **Bane**, M. and Gurd,J., (2005) "SUDA: a program for identifying and grading special uniques". Proceedings of UNECE worksession of statistical Data Confidentiality, Geneva, November 2005.

Michael K **Bane** and Graham D Riley (2002), "Extended Overhead Analysis for OpenMP" in Euro-Par 2002 Parallel Processing, 8<sup>th</sup> International EuroPar Conference, Paderborn, Germany, Aug 2002.

M.K. **Bane**, M.D. Mihajlovic (2001), "A Fast Parallel Solver for the Biharmonic Problem", Proceedings of the Tenth SIAM Conference on Parallel Processing for Scientific Computing, Portsmouth, Virginia USA, 2001

M.K. **Bane** and G.R. Riley (2000) "Automatic Overheads Profiler for OpenMP Codes" EWOMP2000 conference, 14-15 Sept. 2000, University of Edinburgh.

M.K. **Bane**, R. Keller, M. Pettipher & I. Smith (2000) "A Comparison of MPI and OpenMP Implementations of a Finite Element Analysis Code" Cray User Group 22-26 May 2000, Noordwijk NL

M.K. **Bane** and T.L. Freeman, (1992) "Asynchronous Algorithms for Calculating Polynomial Zeros" in "Parallel Computing: Problems, Methods and Applications", ed. Messina, P. and Murli, A., Elsevier, Amsterdam, pp. 53-62, 1992

T.L. Freeman and M.K. **Bane**, (1991) "Asynchronous Polynomial Zero-Finding Algorithms". Parallel Computing 17, pp. 673-681, 1991.

M.K. **Bane** and T.L. Freeman, (1991) "Implementation of Parallel Asynchronous Iterative Methods in occam" in "Applications of Transputers III", ed. Durrani, T.S., et al, I.O.S., Amsterdam, 1991.

T.L. Freeman and M.K. **Bane**, (1990) "An occam Implementation of an Asynchronous Algorithm for Calculating Polynomial Zeros" in "Applications of Transputers II", ed. Pritchard, D.J. and Scott, C.J., I.O.S., Amsterdam, pp. 533-540, 1990

## Education

### PhD in Numerical Analysis and Computing

1988 – 1992, University of Manchester: Doctorate involved implementing numerical algorithms for determining the zeros of polynomials on a novel parallel computer platform (transputer array), focusing on asynchronous communications and performance analysis of the algorithms.

### MSc in Numerical Analysis and Computing

1987 – 1988, University of Manchester: Dissertation involved surveying numerical methods to solve differential-algebraic equations, using real life examples from astrophysics with insights gained and improved methods being taken up by astrophysicists.

### BSc 2(i) in Physics

1984 – 1987, University of Birmingham

## Contact

[mkb@highendcompute.co.uk](mailto:mkb@highendcompute.co.uk) // 0161 225 8735 // 0777 253 6209

Twitter: [@mkbane](https://twitter.com/mkbane) hec // LinkedIn: <https://www.linkedin.com/in/mkbane>

HIGH END COMPUTE Ltd (Reg: 10560924, VAT: 259 3616 77) <https://highendcompute.co.uk>