

# BAIL 2008

## Programme

July 22, 2008

All talks place place in room ERB001 in the Engineering Research Building.

There will be a welcome reception at 8pm on Sunday 27 July in the Common Room which is adjacent to the Engineering Research Building.

On Tuesday 29 July at 6pm there will be a small reception to launch the book “Robust Numerical Methods for Singularly Perturbed Differential Equations” by H.-G. Roos, M. Stynes & L. Tobiska. This will also take place in the Common Room.

On Wednesday 30 July at 1pm buses will leave the University for an excursion to the Burren in County Clare followed by dinner at 7pm in the Corn Barn, Bunratty Folk Park.

## Monday 28 July

- 0850–0910 Opening of conference: J.J.H. Miller, Chair of BAIL International Steering Committee and Prof. Kieran Hodnett, Dean of Science and Engineering, UL
- 0910–1010 Plenary lecture: E. Süli  
“Sparse approximation of high-dimensional degenerate elliptic equations”
- 1010–1035 A. Linke “Colliding flow in a cross-shaped domain — a 2d Navier-Stokes example demonstrating the importance of mass conservation in computational fluid dynamics”
- 1035–1100 J.R. Kweon “For a singular behaviour of compressible fluid flows on a polygon”
- 1100–1125 Coffee break
- 1125–1150 P. Zunino “Discontinuous Galerkin methods based on weighted interior penalties for second order problems with interfaces”
- 1150–1215 H. Zarin “Superconvergence of the continuous/discontinuous Galerkin FEM for elliptic problems with characteristic layers”
- 1215–1240 R. Vulanović “Boundary shock problems and singularly perturbed Riccati equations”
- 1240–1345 Lunch

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### *Mini-symposium on Stabilized Finite Element Methods*

- 1345–1410 G. Matthies “The enrichment approach of the local projection method applied to inf-sup stable discretizations of the Oseen problem”
- 1410–1435 P. Knobloch “On the application of local projection methods to transport problems”
- 1435–1500 F. Schieweck “The stability of CIP and LPS methods for convection-diffusion equations”
- 1500–1525 T. Linß “Mortaring layer-adapted meshes with stabilized FEM”
- 1525–1550 Coffee break
- 1550–1615 G. Lube “Optimal control of a singularly perturbed advection-diffusion reaction problem”
- 1615–1640 H.-G. Roos “Time-dependent convection-diffusion problems and their finite element discretization on Shishkin meshes”
- 1640–1705 V. John “On finite element methods for transient convection-diffusion-reaction equations”
- 1705–1730 J. Löwe “A critical review of stabilization parameter designs for laminar Navier-Stokes flows”
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## Tuesday 29 July

- 0845–0945 Plenary lecture: L. Tobiska  
“Recent results on local projection stabilization for convection-diffusion and flow problems”

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*Mini-symposium on Asymptotic Scaling of Wall-bounded Flow*

- 0950–0955 Opening by M. Buschmann: Introduction to the mini-symposium and the keynote lecture
- 0955–1040 Keynote speaker: A. Kluwick  
“High-Reynolds-number asymptotics of turbulent boundary layers: from fully attached to marginally separated flows”
- 1040–1105 Coffee break
- 1105–1130 B. Müller “A study of the bifurcation characteristics of the plane channel flow undergoing transition under the influence of the Coriolis force”
- 1130–1155 E.-S. Zanoun “Low Reynolds number boundary layer development along smooth and rough surfaces”
- 1155–1220 T. Indinger “Experimental study and large-eddy simulation of a turbulent boundary layer with massive separation induced by an adverse pressure gradient”
- 1220–1245 M. Buschmann “Composite expansion for cross-flow stress”

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- 1235–1345 Lunch
- 1345–1410 H. Steinrück “A thermally induced singularity in a wake”
- 1410–1435 P. Sváček “On numerical simulation of an aeroelastic problem nearby the flutter boundary”
- 1435–1500 H.C. Boisson “Turbulence receptivity of longitudinal-vortex-dominated flows”
- 1500–1525 L. Bogusławski “Influence of flow turbulence on local shear stress distribution on sphere”
- 1525–1550 Coffee break
- 1550–1615 R.E. Khayat “Nonlinear transient flow of a thin film”
- 1615–1640 L. Beneš “Numerical simulation of the towing tank problem using high order schemes”
- 1640–1705 B. Rasuo “Accuracy test results in two-dimensional transonic wind tunnels: problem of boundary layer control”
- 1705–1730 I. Vigdorovich “Scaling laws for turbulent boundary layer flows at favorable and adverse pressure gradient”
- 1800–1830 *Reception to launch book* “Robust Numerical Methods for Singularly Perturbed Differential Equations” by H.-G. Roos, M. Stynes & L. Tobiska *in Common Room*

## Wednesday 30 July

- 0845–0910 C. de Falco “Finite elements with patches for singularly perturbed reaction-diffusion equations”
- 0910–0935 M. Stynes “Solving singularly perturbed reaction-diffusion problems on sparse Shishkin meshes”
- 0935–1000 E. O’Riordan “Singularly perturbed reaction-diffusion problem with a boundary turning point”
- 1000–1025 N. Madden “Overlapping Schwarz techniques for coupled systems of reaction-diffusion equations”
- 1025–1045 Coffee break

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*Hemker Prize lectures*

- 1045–1110 B. Kellogg “The tailored finite point method and a problem of P. Hemker”
- 1110–1135 V. John “Can a FEM-TVD method solve the Hemker problem?”
- 1135–1200 D. Lahaye “Using COMSOL to solve the Hemker problem”

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- 1200–1300 Lunch
- 1300–1900 Excursion to the Burren, Co. Clare
- 1900–late Conference Dinner, The Corn Barn, Bunratty Folk Park

## Thursday 31 July

- 0900–1000 Plenary lecture: A. Fowler  
“Convection in the Earth’s mantle: a seriously singular perturbation problem”
- 1000–1025 J. Mauss “Antisymmetric aspects of the flow in a perturbed channel”
- 1025–1050 P. Caillol “Nonlinear singular Kelvin modes within a columnar vortex”
- 1050–1115 Coffee break
- 1115–1140 Sh. Guseynov “Asymptotical solution of temperature transients singularly perturbed parabolic equations describing electrochemical machining”
- 1140–1205 V.Ya. Neyland “Influence of wall temperature on structure of separation zones in supersonic flow”
- 1205–1230 K. Mansour “Boundary layer solution using Stokes expansion for convection in a high Prandtl number viscous circular cavity”
- 1230–1345 Lunch

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*Mini-symposium on Systems of Singularly Perturbed Differential Equations*

- 1345–1410 J.J.H. Miller “A parameter-uniform finite difference method for a singularly perturbed linear dynamical system of  $n$  equations”
- 1410–1435 C. Clavero “Some techniques to obtain high order schemes for reaction-diffusion singularly perturbed coupled systems”
- 1435–1500 S. Valarmathi “A parameter-uniform finite difference method for a singularly perturbed linear system of  $n$  second order ordinary differential equations of reaction-diffusion type”
- 1500–1525 J.L. Gracia “A system of singularly perturbed semilinear equations”

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- 1525–1550 Coffee break

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*MACSI (Mathematics Applications Consortium for Science and Industry)  
Mini-symposium*

- 1550–1615 M. Gonzalez “Glycolysis as a source of ‘external osmoles’: the vasa recta transient model”
- 1615–1640 M. Viscor “A singularly perturbed parabolic problem that degenerates on one boundary”
- 1640–1705 M. Vynnycky “Electrochemical pickling: asymptotic and numerics”
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# Friday 1 August

- 0845–0945 Plenary lecture: P. Degond  
“Modelling and simulation of dynamical sheaths in plasmas”
- 0945–1010 P.A. Farrell “Examination of the performance of robust numerical methods for singularly perturbed quasilinear differential equations with interior layers”
- 1010–1035 N. Hale “Recent developments in an adaptive rational spectral method”
- 1035–1100 R. Schneider “Anisotropic mesh adaption based on a posteriori estimates and optimisation of node positions”
- 1100–1125 Coffee break
- 1125–1150 S. Pack “Monotone multigrid method for a nonlinear anisotropic system”
- 1150–1215 N. Chadha “Maximum norm a posteriori error estimate for a 3D singularly perturbed semi-linear reaction-diffusion problem”
- 1215–1240 N. Kopteva “A singularly perturbed semilinear reaction-diffusion problem in a polygonal domain”
- 1240 Lunch

## Chairpersons of sessions

Monday	0910–1010 L. Tobiska 1010–1100 B. Kellogg 1125–1240 T. Linß 1345–1730 G. Lube & H.-G. Roos
Tuesday	0845–0945 E. Süli 0950–1245 M. Buschmann & T. Indinger 1345–1525 R.E. Khayat 1550–1730 H. Steinrück
Wednesday	0845–1025 N. Kopteva 1145–1200 E. O’Riordan
Thursday	0900–1000 P. Degond 1000–1050 To be confirmed 1115–1230 J. Mauss 1345–1525 C. Clavero, J.J.H. Miller & S. Valarmathi 1550–1705 A. Hegarty
Friday	0845–0945 A. Fowler 0945–1100 N. Madden 1125–1240 M. Stynes

*All chairpersons of sessions are asked to stay as close as possible to the published timetable. In particular each talk should end a few minutes before its timeslot ends, to allow time for questions and for changeover to the next speaker.*