

## Abbreviated Resume

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### Personal

Name: Andrey V. Kuznetsov

### Address

Dept. of Mechanical & Aerospace Engineering  
North Carolina State University  
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### Areas of Expertise

Numerical and analytical modeling of heat and mass transfer processes; transport processes in porous media; reacting multiphase flows; flows in coating processes; phase change processes; flow, heat, and mass transfer in casting and welding; transport processes in biological tissues; heat and mass transfer in fire fighter protective garment; flows in bacterial suspensions

### Professional Preparation

Bauman State Technical University (Moscow)	Mechanical Engineering	M.S., 1988
Moscow State University (Moscow)	Applied Mathematics	M.S., 1990
Mechanical Engineering Research Institute of Russian Academy of Sciences (Moscow)	Mechanical Engineering	Ph.D., 1992

#### Postdoctoral experience:

Korea Institute of Science and Technology (Seoul)	Mechanical Engineering	1993
Ruhr-University of Bochum (Bochum)	Mechanical Engineering	1993
Ohio State University (Columbus, OH)	Mechanical Engineering	1994
Technical University of Vienna (Vienna)	Mechanical Engineering	1995-1997

### Professional Appointments

Associate Professor, North Carolina State University, Department of Mechanical and Aerospace Engineering, Raleigh, NC, USA, 8/02 - present

Associate Member of BME Faculty, UNC/NCSU Joint Dept. of Biomedical Engineering, NC, 12/05 - present

Assistant Professor, North Carolina State University, Department of Mechanical and Aerospace Engineering, Raleigh, NC, USA, 1/98 – 7/02

Senior Research Scientist, Technical University of Vienna, Institute of Fluid Mechanics and Heat Transfer, Vienna, Austria, 4/95 - 12/97

Research Scientist, Mechanical Engineering Research Institute of Russian Academy of Sciences, Moscow, Russia, 1/92 - 12/97

University Postdoctoral Fellow, Ohio State University, Department of Mechanical Engineering, Columbus, OH, USA, 1/94 - 12/94

Alexander von Humboldt Foundation Research Fellow, Ruhr-University Bochum, Institute of Power Engineering, Bochum, Germany, 6/93 - 12/93

Senior Visiting Scholar, Korea Institute of Science and Technology, Seoul, Korea, 3/93 - 4/93

### Academic Honors and Awards

2005 – Alcoa Foundation Engineering Research Achievement Award, NC State

2001 – a panelist on "Fundamentals of Modeling Transport in Porous Media: from Micro- to Macroscale." panel (35th Nat HT Conference, Anaheim, CA, 10-12 June, 2001)

1997 - Japan Society for the Promotion of Science (JSPS) Research Fellowship

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1994 - The Ohio State University Postdoctoral Fellowship  
1993 - Alexander von Humboldt Foundation Research Fellowship

### Membership in Editorial Boards

2003-2004 - Co-editor of the *International Journal of Fluid Mechanics Research* (published by Begell House)  
2005-present – Member of the Editorial Board of the *International Journal of Fluid Mechanics Research* (published by Begell House)  
2003-2005 – Key Reader (member of the Board of Review) of Metallurgical and Materials Transactions B, first term  
2006-2008 – Key Reader (member of the Board of Review) of Metallurgical and Materials Transactions B, second term

### Graduate Students

MS thesis directed: 4, current: 2  
PhD thesis directed: 10, current: 2

### Publications

203 archival journal papers, 1 book, 9 archival book chapters, 73 refereed conference papers

### Selected Publications

S.M. Becker and A.V. Kuznetsov, Thermal *in-vivo* Skin Electroporation Pore Development and Charged Macromolecule Transdermal Delivery: A numerical Study of the Influence of Chemically Enhanced Lower Lipid Phase Transition Temperatures, *International Journal of Heat and Mass Transfer*, vol. 51, pp. 2060-2074, 2008.

D.A. Nield and A.V. Kuznetsov, The Effect of Combined Vertical and Horizontal Heterogeneity on the Onset of Convection in a Bidisperse Porous Medium, *International Journal of Heat and Mass Transfer*, vol. 50, pp. 3329-3339, 2007.

S.M. Becker and A.V. Kuznetsov, Thermal Damage Reduction Associated with *in Vivo* Skin Electroporation: A Numerical Investigation Justifying Aggressive Pre-Cooling, *International Journal of Heat and Mass Transfer*, vol. 50, pp. 105-116, 2007.

D.A. Nield and A.V. Kuznetsov, The onset of convection in a bidisperse porous medium, *International Journal of Heat and Mass Transfer*, vol. 49, pp. 3068-3074, 2006.

S.M. Becker and A.V. Kuznetsov, Numerical Modeling of *in vivo* Plate Electroporation Thermal Dose Assessment, *ASME Journal of Biomechanical Engineering*, vol. 128, pp. 76-84, 2006.

A.A. Avramenko, A.V. Kuznetsov, B.I. Basok, and D.G. Blinov, Investigation of stability of a laminar flow in a parallel-plate channel filled with a fluid saturated porous medium, *Physics of Fluids*, vol. 17, paper 094102, pp. 1-6, 2005.

D.A. Nield and A.V. Kuznetsov, Forced Convection in a Helical Pipe Filled with a Saturated Porous Medium, *International Journal of Heat and Mass Transfer*, vol. 47, pp. 5175-5180, 2004.

Q. Wan and A.V. Kuznetsov, Streaming in a Channel Bounded by an Ultrasonically Oscillating Beam and Its Cooling Efficiency, *Numerical Heat Transfer A*, vol. 45, pp. 21-47, 2004.

D.A. Nield, A.V. Kuznetsov, and M. Xiong, Thermally Developing Forced Convection in a Porous Medium: Parallel Plate Channel with Walls at Uniform Temperature, with Axial Conduction and Viscous Dissipation Effects, *International Journal of Heat and Mass Transfer*, vol. 46, pp. 643-651, 2003.

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- D.A. Nield, A.V. Kuznetsov, and M. Xiong, Effect of Local Thermal Non-Equilibrium on Thermally Developing Forced Convection in a Porous Medium, *International Journal of Heat and Mass Transfer*, vol. 45, pp. 4949-4955, 2002.
- D.A. Nield and A.V. Kuznetsov, The Interaction of Thermal Nonequilibrium and Heterogeneous Conductivity Effects in Forced Convection in Layered Porous Channels, *International Journal of Heat and Mass Transfer*, vol. 44, pp. 4369-4373, 2001.
- W.-S. Kim, D.-S. Kim, and A.V. Kuznetsov, Simulation of Coupled Turbulent Flow and Heat Transfer in the Wedge-Shaped Pool of a Twin-Roll Strip Casting Process, *Int. J. Heat Mass Transfer*, vol. 43, pp. 3811-3822, 2000
- D.A. Nield and A.V. Kuznetsov, Effect of Heterogeneity in Forced Convection in a Porous Medium: Parallel Plate Channel or Circular Duct, *Int. J. Heat Mass Transfer*, vol. 43, pp. 4119-4134, 2000
- A.V. Kuznetsov, Analytical Studies of Forced Convection in Partly Porous Configurations, *Handbook of Porous Media*, K. Vafai (Editor), Marcel Dekker, New York, 2000, pp. 269-312
- D.A. Nield and A.V. Kuznetsov, Local Thermal Nonequilibrium Effects in Forced Convection in a Porous Medium Channel: A Conjugate Problem, *Int. J. Heat Mass Transfer*, vol. 42, pp. 3245-3252, 1999
- A.V. Kuznetsov, Analytical Investigation of Couette Flow in a Composite Channel Partially Filled with a Porous Medium and Partially with a Clear Fluid, *Int. J. Heat Mass Transfer*, vol. 41, pp. 2556-2560, 1998
- A.V. Kuznetsov, Thermal Nonequilibrium Forced Convection in Porous Media, Chapter in "*Transport Phenomena in Porous Media*", D.B. Ingham and I. Pop (Editors), Elsevier, Oxford, 1998, pp. 103-129
- A.V. Kuznetsov, Investigation of the Coupled Heat Transfer, Fluid Flow and the Solute Transport during the Strip Casting Process, *Int. J. Heat Mass Transfer*, vol. 40, pp. 2949-2961, 1997
- A.V. Kuznetsov, A Perturbation Solution for Heating a Rectangular Sensible Heat Storage Packed Bed with a Constant Temperature at the Walls, *Int. J. Heat Mass Transfer*, vol. 40, pp. 1001-1006, 1997
- A.V. Kuznetsov, Optimal Control of the Heat Storage in a Porous Slab, *Int. J. Heat Mass Transfer*, vol. 40, pp. 1720-1723, 1997
- A.V. Kuznetsov, A Perturbation Solution for a Nonthermal Equilibrium Fluid Flow through a Three-Dimensional Sensible Heat Storage Packed Bed, *ASME Journal of Heat Transfer*, vol. 118, pp. 508-510, 1996
- A.V. Kuznetsov and K. Vafai, Analytical Comparison and Criteria for Heat and Mass Transfer Models in Metal Hydride Packed Beds, *Int. J. Heat Mass Transfer*, vol. 38, pp. 2873-2884, 1995
- A.V. Kuznetsov and K. Vafai, Development and Investigation of Three-Phase Model of the Mushy Zone for Analysis of Porosity Formation in Solidifying Castings, *Int. J. Heat Mass Transfer*, vol. 38, pp. 2557-2567, 1995
- A.V. Kuznetsov, An Investigation of a Wave of Temperature Difference between Solid and Fluid Phases in a Porous Packed Bed, *Int. J. Heat Mass Transfer*, vol. 37, pp. 3030-3033, 1994