

VITTORIO E. BADALASSI PHD CENG MNUCL

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EDUCATION

Executive Education, *Innovation and the Business of Science*, Imperial Coll. Bus.Sc. 9/2013-12/2016
Ph.D. in *Chemical Engineering*, University of California, Santa Barbara, USA 10/1998-9/2004
M.S. in *Mechanical Engineering (Nuclear minor)*, Univ. degli Studi di Genova, Italy 10/1991-9/1998

EXPERIENCE

Distinguished R&D Staff Member - Nuclear Thermal Hydraulics 10/2019-present
Oak Ridge National Laboratory, Oak Ridge, TN, USA

- Developing, demonstrating, and qualifying predictive simulation software for nuclear thermal hydraulics and safety applications through leveraging high-fidelity computational fluid dynamics (CFD), reduced-order thermal hydraulic models, and advanced data analytics
- Leader, set up the strategy and the investments on computational fluid dynamics for the whole laboratory

CEO – VB Hi-Tech Ventures Ltd 7/2018-present

- I opened my own startup to develop a new flying device based on my own PTC patent (GB1801192.4). The UK Patent Office found original 31 out of 34 claims
- Fund raising at seed phase (proposals to DSTL, Lockheed, Horizon 2020 etc.)

Member of the Euratom Group of Experts 10/2018-present

- I evaluate Euratom funding for nuclear research (Horizon2020 - NFRP calls)

Chief Nuclear Engineer – Nuclear Safety, Pallas Reactor, Alkmaar, Netherland 1/2017-07/2018

- Design requirements definition (safety and isotope production optimization)
- Safety function Development & safety (bids) evaluation of the reactor vendors
- Management of the safety team and related contractors
- Simulation capability development (CSAU, RELAP5, MCNP, StarCCM+)
- Assessment of R&D requirements and possible public and private funding

Principal Investigator - Royal Society Fellow, Rolls-Royce, London, UK 9/2013-12/2016

- Winner of a prestigious fellowship for \$125k (I proposed an original CFD research)
- Raised private (RR) and public (EPSRC) funding (\$3Mn total) for the development of simulation methods in boiling, severe accidents and radiation transport
- Lead a team of 1 post-Doc & 2 students and co-authored 6 journal papers
- Delivered to Rolls-Royce a state of the art DGFEM radiation transport code

Consultant - Rolls-Royce PLC/NuScale Power 1/2014-4/2014

- Design finalization of the NuScale reactor – steam generator
- Thermal-Hydraulic modelling of the helically coiled steam generator

Chief of Modeling and Simulation, Civil Nuclear, Rolls-Royce, Derby, UK 5/2011-8/2013

- Raised funding (1Mn\$) and managed a team of up to five engineers and three students to develop the simulation capability
- Development of a Small Modular Reactors simulator and their design evaluation
- Member of the first CASL industry council on behalf of Rolls-Royce Nuclear

Systems Engineer Rolls-Royce PLC/Westinghouse 10/2009-4/2011

- Design finalization of the AP1000 nuclear reactor and I won 80k\$ contract
- Designed the SG blowdown system and the co-designed the turbine control system.

- CFD Developer, Aerothermal Methods, Aerospace, Rolls-Royce, Derby, UK** 12/2007-9/2009
- Simulated and co-designed the Trent 1000 low pressure (LP) turbine
 - Developed the particle tracking modeling/solver for the Rolls-Royce code Hydra
- Development Engineer, Arena-Flow LLC, Albuquerque, NM, USA** 4/2006-5/2007
- Consultant for Solutia: resolved the abnormal erosion rates in the cyclones
 - Lead developer of the commercial code “Barracuda”
- Development Engineer, MetaHeuristics LLC, Santa Barbara, CA** 9/2004-3/2006
- Lead developer of a new Lattice-Boltzmann CFD code “MetaFlow” which is able to simulate the complex turbulent cooling of the I.T.E.R. first wall (DOE)
 - Co-winner of the related SBIR grant (1Mn\$ funding)
- Graduate Student Researcher & Teaching Assistant, Department of Chemical Engineering, University of California, Santa Barbara, CA, USA** 9/1998-8/2004
- Developed a 3D, finite volume numerical method for gas-liquid turbulent flows using the Navier-Stokes and level-set equation for interface tracking.
 - Developed a new 3D numerical method for investigating complex multiphase systems for near-critical conditions (phase separation and spinodal turbulence).
- Visiting Research Scholar, Dept. of Nuclear Eng., Purdue University, IN, USA** 7/1997-6/1998
- Simulation using RELAP5 of two-phase flow natural circulation instabilities measured in the PUMA facility, a scaled GE SBWR

AWARDS AND HONORS

- Royal Society Industry Fellow 9/2013-12/2017
- Chartered Engineer, Member of the Nuclear Institute 11/2017
- Front cover “Transport Phenomena in Microgravity”, Annals of the New York Academy of Sciences Vol. 1027. 12/2004
- Young Researcher Fellowship, Universita degli Studi di Genova, Italy. 7/1997-6/1998

PUBLICATIONS

1. B. O'Malley, J. Kophazi, M. Eaton; V. Badalassi; P. Warner; A. Copestake, “Discontinuous Galerkin spatial discretisation of the neutron transport equation with pyramid finite elements and a discrete ordinate (SN) angular approximation”, *Annals of Nuclear Energy*, 113: 526-535, 2018
2. B. O'Malley, J. Kophazi, M. Eaton; V. Badalassi; P. Warner; A. Copestake, “Pyramid finite elements for discontinuous discretizations of the discrete ordinates SN neutron transport equation”, *Progress in Nuclear Energy* 105:175–184, 2018
3. J. S. Murallidharan, B.V.S.Prasad, B.S.V.Patnaik, G.F.Hewitt, V.Badalassi, “CFD investigation and assessment of wall heat flux partitioning model for the prediction of high pressure subcooled flow boiling”, *International Journal of Heat and Mass Transfer*, 103: 211-230, 2016
4. De Luca D., Petruzzi A., Eaton M., Badalassi V., Scott J., “Development and Qualification of RELAP5-3D Nodalization of the Core of OPAL RR”, NUTHOS-11: The 11th International Topical Meeting on Nuclear Reactor Thermal Hydraulics, Operation and Safety Gyeongju, Korea, October 9-13, 2016
5. J. S. Murallidharan, G. Giustini, Y. Sato, B. Niceno, V. Badalassi, S. Walker, “Computational Fluid Dynamic Simulation of Single Bubble Growth under High-Pressure Pool Boiling Conditions”, *Nuclear Engineering and Technology*, 48 (4):859–869, 2016
6. G. Giustini, J. S. Murallidharan, Y. Sato, B. Niceno, V. Badalassi, S. Walker, “Numerical Study of Heat Diffusion Controlled Phase Growth in a Pressurized Liquid”, The 16th International Topical Meeting on Nuclear Reactor Thermal Hydraulics (NURETH-16), Hyatt Regency Chicago, Chicago, IL, USA, August 30-September 4, 2015

7. B. Mills, R. I. Latchford and V. Badalassi, "Nuclear Power Plant Simulator for Concept Design and Performance Analysis", *ICONE20-POWER2012-54475*, pp. 121-128
8. K. Williams, D. Snider, V. Badalassi, S.B. Reddy Karri, T.M. Knowlton, and R.A. Cocco, "Computational Particle Fluid Dynamics Simulations and Validation for Cyclones: High and Low Loadings", *AICHE 2006 National Meeting*
9. S. Banerjee, V.E. Badalassi, V. Dwivedi, J.-C. Nave, D. Hall, "The direct numerical simulation of two-phase flows with interface capturing methods", *La Houille Blanche* 5, 2005
10. V.E. Badalassi, S. Banerjee, "Nano-structure computation with coupled momentum phase ordering kinetics models", *Nuclear Engineering and Design* 235: 1107-1115, 2005
11. V.E. Badalassi, H.D. Cenicerros, S. Banerjee, "Gravitational effects on structure development in quenched complex fluids", *Annals of the New York Academy of Sciences* 1027: 1-12, 2004
12. V.E. Badalassi, H.D. Cenicerros, S. Banerjee, "Computation of multiphase systems with phase-field models", *Journal of Computational Physics* 190: 371-397, 2003
13. V. Badalassi, H. Takahira, S. Banerjee, "Numerical simulation of three dimensional bubble growth and detachment in a microgravity shear flow," Fifth Microgravity Fluid Physics and Transport Phenomena Conference, Cleveland, OH, August 2000
14. S. T. Revankar, M. Ishii, Y. Xu, T. Leonardi, V. Badalassi, M. Rapp, M. L. Bertodano, V. H. Ransom, R. Viskanta, J. T. Han, Single-Phase and two-Phase Natural Circulation Tests in the PUMA Facility, US Nuclear Regulatory Commission, NUREG/CR-5498, PU/NE-98-7, August (1998)

PATENTS

GB1801192.4, V. Badalassi, Title: A vertical take-off and landing flying machine, 24 January 2018.