Professor Yuri Bazilevs

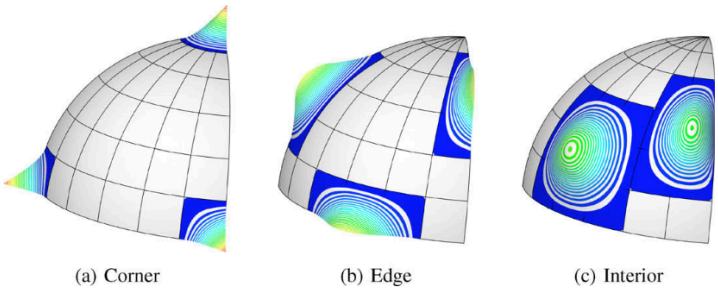

Fig. 1. NURBS mesh of a quarter hemisphere consisting of 6 × 6 quadratic elements. Selected corner, edge, and interior basis functions are plotted on the actual geometry, which is represented exactly.

From: D. J. Benson, Y. Bazilevs, M. C, Hsu and T. J. R. Hughes, "Isogeometric Shell Analysis: The Reissner-Mindlin Shell," Computer Methods in Applied Mechanics and Engineering, Vol. 199, No. 5-8, 2010, pp. 276-289

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Mechanical and Aerospace Engineering
Jacobs School of Engineering
University of California San Diego (UCSD)

Research Interests:
Design of robust and efficient computational methods for large scale, high performance computing:
Yuri Bazilevs's research interests lie in the field of computational science and engineering with an emphasis on computational mechanics. The focus of his research efforts is the design of accurate, robust, and efficient computational methods for problems of contemporary engineering interest, and their implementation in large-scale, high performance computing environments. Prof. Bazilevs is a co-developer of a new computational technology called Isogeometric Analysis. In essence, Isogeometric analysis builds on the primitives of computer-aided design and computer graphics systems, it generalizes and improves upon finite element analysis, and it has the potential to bridge the gap between design and analysis. Prof. Bazilevs also works on fluid-structure interaction analysis, which is an area of research currently receiving considerable attention. He devised a fully-integrated isogeometric fluid-structure interaction framework enabling him to solve problems of interest ranging from marine engineering to vascular blood flow. He developed a parallel, general geometry, transient, three-dimensional fluid-structure code, together with a modeling system based on templates for patient-specific cardiovascular anatomy. The procedures are applied to various patient-specific models including abdominal aortic and cerebral aneurysms, a thoracic aorta with left ventricular assist device (LVAD), and a catheter-based drug delivery system for coronary arteries.

Capsule Biography:
Yuri Bazilevs is an assistant professor of Structural Engineering at UC San Diego. His research focuses on computational science and engineering for the development of robust computational methods for large scale high performance computing. Prior to joining UC San Diego, Dr. Bazilevs was a J.T. Oden ICES Postdoctoral Fellow (2006-2008) and also a lecturer in the Department of Aerospace Engineering and Engineering Mechanics at UT Austin (2007-2008). He has published more than 20 articles in refereed archival journals and

over 30 refereed conference proceedings articles, book chapters, and technical reports on computational solid and fluid dynamics, computational fluid-structure interaction, isogeometric analysis, turbulence modeling, and mathematics of finite elements and related approaches.

Education:
Ph.D. Computational and Applied Mathematics, 2006, University of Texas at Austin
M.S. Mechanical Engineering, 2001, Renssalaer Polytechnic Institute, New York
B.S. Mechanical Engineering (Magma cum Laude), 2000, Renssalaer Polytechnic Institute, New York

Awards:
2011 U.S. Association for Computational Mechanics Gallagher Young Investigator Award
2011 NSF Career Awards
J.T. Oden ICES Postdoctoral Fellowship, ICES, UT Austin, 2006-present

Selected Publications:
Books:
Yuri Bazilevs, Kenji Takizawa and Tayfun E. Tezduyar, Computational Fluid-Structure Interaction: Methods and Applications, John Wiley & Sons, 2013
Cottrell, J.A., Bazilevs, Y. and Hughes, T.J.R. (2009) Isogeometric Analysis: Towards Integration of CAD and FEA. Wiley.

Journal Articles:
S. Lipton, J.A. Evans, Y. Bazilevs, T. Elguedj, T.J.R. Hughes, Robustness of isogeometric structural discretizations under severe mesh distortion. Comput. Meth. Appl. Mech. Engrg. 199 (2010) 357–373.
J. Kiendl, Y. Bazilevs, M. C. Hsu, R. Wüchner and K. U. Bletzinger, "The Bending Strip Method for Isogeometric Analysis of Kirchhof-Love Shell Structures Comprised of Multiple Patches," Computer Methods in Applied Mechanics and Engineering, Vol. 199, No. 37-40, 2010, pp. 2403-2416
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Bazilevs, Y., Gohean, J.R., Hughes, T.J.R., Moser, R.D., and Zhang, Y., (2008). "Patient-specific isogeometric fluid-structure interaction analysis of thoracic aortic blood flow due to implantation of the Jarvik 2000 left ventricular assist device," Computer Methods in Applied Mechanics and Engineering. In review.
Evans, J.A., Bazilevs, Y., Babuska, I., and Hughes, T.J.R., (2008). "N-widths, sup-infs, and optimality ratios for the k-version of the isogeometric finite element method," Computer Methods in Applied Mechanics and Engineering. Accepted for publication.
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Bazilevs, Y., Michler, C., Calo, V.M., and Hughes, T.J.R., (2008). "Isogeometric variational multiscale modeling of wall-bounded turbulent flows with weakly-enforced boundary conditions on unstretched meshes," Computer Methods in Applied Mechanics and Engineering. Accepted for publication.
Bazilevs, Y., and Hughes, T.J.R., (2008). "Using Isogeometric Analyais to compute flows with rotating components," Computational Mechanics, Published online.

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Bazilevs, Y., Calo, V.M., Hughes, T.J.R., and Zhang, Y., (2008). “Isogeometric fluid-structure interaction: Theory, algorithms and computations,” Computational Mechanics, 43 (2008) 3–37
Elguedj, T., Bazilevs, Y., Calo, V.M., and Hughes, T.J.R., (2008), “B-bar and F-bar projection methods for nearly incompressible linear and nonlinear elasticity and plasticity using higher-order NURBS elements,” Computer Methods in Applied Mechanics and Engineering, 197, 2732-2762.
Isaksen, J., Bazilevs, Y., Kvamsdal, T., Zhang, Y., Kaspersen, J.H., Waterloo, K., Romner, B., and Ingebrigtsen, T., (2007). “Determination of wall tension in cerebral artery aneurysms by numerical simulation,” Stroke, Accepted for publication.
Bazilevs, Y., Michler, C., Calo, V.M., and Hughes, T.J.R., (2007). “Weak Dirichlet boundary conditions for wall-bounded turbulent flows,” Computer Methods in Applied Mechanics and Engineering, 196, 4853-4862.
Zhang, Y., Bazilevs, Y., Goswami, S., Bajaj, C., and Hughes, T.J.R., (2007). “Patient-specific vascular NURBS modeling for isogeometric analysis of blood flow,” Computer Methods in Applied Mechanics and Engineering, 196, 2943-2959.
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Bazilevs, Y., Beirao da Veiga, L., Cottrell, J.A., Hughes, T.J.R., and Sangalli, G., (2006). “Isogeometric analysis: Approximation, stability and error estimates for h-refined meshes,” Mathematical Methods and Models in Applied Sciences, 16, 1031-1090.
Cottrell, J.A., Reali, A., Bazilevs, Y., and Hughes, T.J.R., (2006). “Isogeometric analysis of structural vibrations," Computer Methods in Applied Mechanics and Engineering, 195, 5257-5296.
Hughes, T.J.R., Cottrell, J.A., and Bazilevs, Y., (2005). “Isogeometric analysis: CAD, finite elements, NURBS, exact geometry and mesh refinement," Computer Methods in Applied Mechanics and Engineering, 194, 4135-4195.