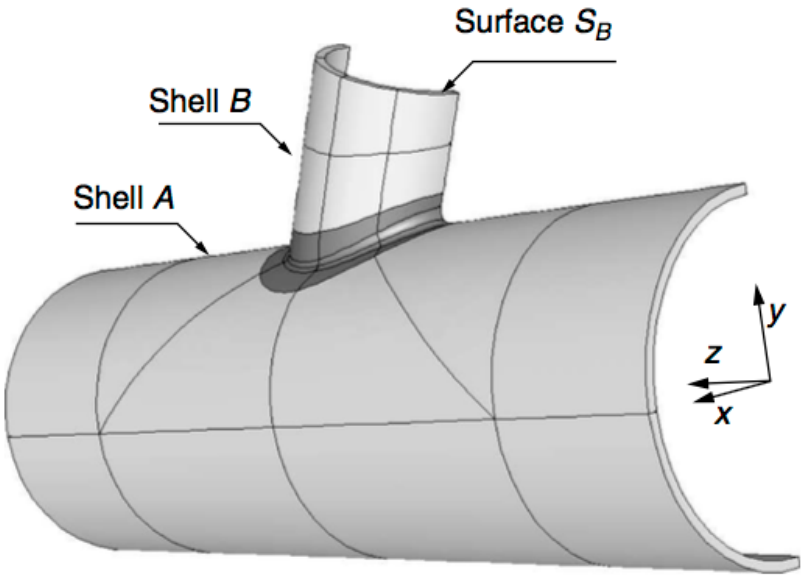

Professor Ernst Rank

From: Düster A, Rank E, Szabó B: "The p-Version of the Finite Element and Finite Cell Methods". In: Encyclopedia of Computational Mechanics, 2nd edition, Vol. 2: Solids and Structures, Chapter 4. Editors: Erwin Stein, Rene de Borst and Thomas J.R. Hughes, John Wiley & Sons Ltd, 2017.

See:
http://www.professoren.tum.de/en/rank-ernst/
https://www.ias.tum.de/en/institute-for-advanced-study/organization/staff/prof-dr-ernst-rank/
https://scholar.google.com/citations?user=0hGn2gYAAAAJ&hl=en
https://www.researchgate.net/profile/Ernst_Rank

Director, Institute for Advanced Study
Technical University of Munich (TUM), Germany

Academic Career and Research Areas:
Professor Rank conducts research into numerical mechanics and building informatics. Key areas of his research include high-order finite element methods, immersed boundary methods, and combining numerical computation with geometric modeling. His work is aimed at developing effective and intuitively usable simulation methods, which can be used to optimize industrial products and processes. Professor Rank studied mathematics and physics at LMU Munich and completed his doctorate at TUM in 1985. With the support of a research grant, he was then able to work in the USA until 1986. After a period of work in industry at Siemens AG, he took up a professorship first at TU Dortmund and later, in 1997, at TUM. Professor Rank served as Vice President for Research at TUM from 2002 to 2008, was Founding Director of the TUM International Graduate School of Science and Engineering from 2006 to 2016, and was Director of the TUM Graduate School from 2008 to 2013. He has been Chairman of the University Council of TU Dortmund since 2007 and Director of the TUM Institute for Advanced Study (TUM-IAS) since 2015.

Awards:
Fellow of the International Association for Computational Mechanics (2018)
Member of the Bavarian Academy of Sciences and Humanities (2017)
Corresponding member of the North Rhine-Westphalian Academy of Sciences (2014)

Konrad Zuse Medal (2009)
Federal Cross of Merit (2009)

Selected Publications:

S. Holzer, E. Rank, and H. Werner, "An implementation of the hp-version of the finite element method for Reissner-Mindlin plate problems," International Journal for Numerical Methods in Engineering, vol. 30, no. 3, pp. 459–471, 1990.

E. Rank. Adaptive remeshing and h-p domain decomposition. Computer Methods in Applied Mechanics and Engineering, 101:299–313, 1992.

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E. Rank and R. Krause. A multiscale finite element method. Computers & Structures, 64(1):139–144, 1997.

Rank, E., Krause, R. and Preusch, K. (1998), "On the Accuracy of p-Version Elements for the Reissner.-Mindlin Plate Problem",International Journal for Numerical Methods in Engineering,43, 51–67.

A. Duester, E. Rank, G. Steinl and W. Wunderlich, "A combination of an h- and a p-version of the finite element method for elastic-plastic problems", European Conference on Computational Mechanics (ECCM '99), August 31-September 3, Munich, Germany, 1999

A. Duester, H. Broeker, and E. Rank. The p-version of the finite element method for three-dimensional curved thin walled structures. International Journal for Numerical Methods in Engineering, 52:673–703, 2001.

Ernst Rank, Henrike Broeker, Alexander Duester and Vera Nuebel, "High order solid elements for thin-walled structures: No tricks? – No Crimes!", Trends in Computational Structural Mechanics, W.A. Wall, K.U. Bletzinger and K. Schweizerhof (Editors), CIMNE, Barcelona, Spain 2001

A. Duester, A. Niggl and E. Rank, "Thermo-elastic computations of geometrically non-linear three-dimensional thin-walled continua based on high order finite elements", Fifth World Congress on Computational Mechanics (WCCM V), July 7-12, 2002, Vienna, Austria, H.A. Mang, F.G. Rammerstorfer and J. Eberhardsteiner (Editors)

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R. Krause and E. Rank. Multiscale computations with a combination of the h-and p-versions of the finite element method. Computer Methods in Applied Mechanics and Engineering, 192(35):3959–3983, 2003.

A. Düster, S. Hartmann and E. Rank. p-FEM applied to finite isotropic hyperelastic bodies. Comput. Methods Appl. Mech. Engrg., 192: 5147-5166, 2003

B.A. Szabo □, A. Duester, and E. Rank. The p-version of the Finite Element Method. In E. Stein, R. de Borst, and T. J. R. Hughes, editors, Encyclopedia of Computational Mechanics, volume 1, chapter 5, pages 119–139. John Wiley & Sons, 2004.

Ernst Rank, Alexander Duester and Zobayer Alam, "Adaptive computation of thin-walled structures based on high order solid finite elements", Computational Mechanics, WCCM VI in conjunction with APCOM'04, Sept. 5-10, 2004, Beijing, China, Tsinghua University Press & Springer-Verlag

E. Rank, A. Duester, A. Muthler and R. Romberg, "High order solid elements for thin-walled structures with applications to linear and non-linear structural analysis", European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2004), P. Neittaanmaeki, T. Rossi, S. Korotov, E. Onate, J. Periaux and D. Knoerzer (Editors), Jyvaeskylae, 24-28 July 2004

Stefan Diebels, Tobais Ebinger, Holger Steeb, Alexander Duester and Ernst Rank, "Modeling materials with lattice microstructure by an higher order FE approach", International Conference on Computational Methods for Coupled Problems in Science and Engineering (Coupled Problems 2005), M. Papadrakakis, E. Onate and B. Schrefler (Editors), CIMNE, Barcelona, 2005

E. Rank, A. Düster, V. Nübel, K. Preusch and O.T. Bruhns. High order finite elements for shells. Comput. Methods Appl. Mech. Engrg., 194: 2494-2512, 2005
D. Scholz, S. Kollmannsberger, A. Duester and E. Rank, "Thin solids for fluid structure interaction", Lecture Notes in Computational Science and Engineering, March 2006, DOI: 10.1007/3-540-34596-5_12
S. Kizio, K. Schweizerhof, A. Duester and E. Rank, "Benchmark computations of low and high order shell elements on adaptively generated FE meshes", paper from unidentified conference at Karlsruhe University, October 2006
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D. Schillinger, L. Dede', M.A. Scott, J.A. Evans, M.J. Borden, E. Rank, T.J.R. Hughes: An Isogeometric Design-through-analysis Methodology based on Adaptive Hierarchical Refinement of NURBS, Immersed Boundary Methods, and T-spline CAD Surfaces. Computer Methods in Applied Mechanics and Engineering 249-250 :116-150, 2012.
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