

Dr.-Ing.

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Born March, 1971, Rostock, Germany

Career

- 2002 – present Heat of Prothetics and Diagnostics, Institute for Applied Computer Science, Forschungszentrum Karlsruhe, Germany
- 2000 – 2002 Senior researcher, Head of the Fluidic robotics Group, Institute for Applied Computer Science, Forschungszentrum Karlsruhe, Germany
- 1997 – 1999 Research assistant, Medical Technics, Institute for Applied Computer Science, Forschungszentrum Karlsruhe, Germany

Research Interests

lightweight robot arms, multifingered hands, hand-prosthesis,
soft robotics and flexible joint manipulators, haptic feedback,
human-machine systems, virtual reality hardware, medical soft robotics

Honours

- „Scientific Award 2005 BMW Group - 1.Platz Dissertation“, Leipzig, 2005
- “Award 2005 - Innovationen aus der Natur, Innovationspreis des BmbF, Berlin, 2005
- „Felix Buda Award“, Sonderpreis der Krebsstiftung für ein besonderes Engagement um die Entwicklung fortschrittlicher Technologien im Bereich Magen-Darm- Krebsprävention, München, 2005
- „Dr. Ing. Höfler-Doktorandenpreis“: Beste Dissertation des Jahres 2003 der Universität Karlsruhe, Fakultät Maschinenbau, mit fertigungs-, mess- oder regelungstechnischer Zielsetzung, Karlsruhe, 2004

Activities/Competence

- Scientific Consultant, Institute for Fluidic Systems, Steinbeis GmbH & Co. KG für Technologietransfer, Stuttgart, Germany
- Invited Speaker on Tutorials and Workshops on Rehabilitation
- Member of program for “Excellent scientists”, Forschungszentrum Karlsruhe, Germany

Most Important Relevant Publications (Selected)

- S. Schulz**, H. Besser et. al.: „Hydraulische Muskeln als Antriebseinheit für endoluminale Systeme in der Medizin“. 3.Statuskolloquium des Projektes Mikrosystemtechnik, Wissenschaftliche Berichte, FZKA-6080, S.205ff, Karlsruhe, Germany, 1998.
- S. Schulz**, C. Pylatiuk, G. Bretthauer: „A New Class of Flexible Fluidic Actuators and their Applications in Medical Engineering“. At 47 (8), S.390ff, Germany, 1999.
- S. Schulz**, C. Pylatiuk, G. Bretthauer: „Künstliche Hand mit flexiblen Fluidaktoren“. VDMA Nachrichten 11/2000, S.27ff, Germany, 2000.
- S. Schulz**, C. Pylatiuk, G. Bretthauer: „Druckluft in den Fingern“. Spektrum der Wissenschaft 5/2001, S.60ff, Germany, 2001.
- S. Schulz**, C. Pylatiuk, G. Bretthauer: „A New Ultralight Anthropomorphic Hand“. Proc. of the ICRA 2001, S. 2437ff, Seoul, Korea, 2001.
- S. Schulz**, C. Pylatiuk: „A Lightweight Bionic Hand Prosthesis“. Proc. of the 2001 ISPO World Congress, MO 6.2, Glasgow, Scotland, 2001.

- **S. Schulz**, G. Bretthauer: „A fluidic humanoid robothand”. HUMANOIDS 2001 : Proc. of the Internat. Conf. on Humanoid Robots, S.133ff, Tokyo, Japan, 2001.
- **S. Schulz**, C. Pylatiuk: „Advances in the development of a hydraulic driven multifunctional prosthetic hand”. Int. Conf. of European Society for Engineering and Medicine / European Society for Artificial Organs, Halle, Germany, 2003.
- **S. Schulz**: „Die Entwicklung einer Hightech-Handprothese; Zeitschrift für Handtherapie, Rehabilitation der oberen Extremität“. 5/03, Deutsche Arbeitsgemeinschaft für Handtherapie e.V, DAHTH e.V. Eigenverlag, München, Germany, 2003.
- **S. Schulz**: „Eine neue Adaptiv-Hand-Prothese auf der Basis Flexibler Fluidaktoren“, Dissertation, Shaker Verlag, Stuttgart, Germany, 2003.
- **S.Schulz**, A.Ebersoldt, A.Kargov, R.Oberle, C.Pylatiuk. "Künstliche Hand auf der Basis flexibler Fluidaktoren" 11. Symposium Maritime Elektrotechnik, Elektronik und nformationstechnik. Univ. Rostock, Univ.-Druckerei 534-04, S.133ff Rostock, Germany, 2004.
- **S. Schulz**, C. Pylatiuk, M. Reischl, J. Martin, R. Mikut, G. Bretthauer: „A Lightweight Multifunctional Prosthetic Hand“. Publikation in Robotica, UK, 2004.
- **S. Schulz**, C. Pylatiuk, M. Reischl, J. Martin, R. Mikut, G. Bretthauer: A Lightweight Multifunctional Prosthetic Hand. Robotica, 23(3), 293-299, ISSN: 0263-5747, 2005.
- **S. Schulz**, C. Pylatiuk: “Peristaltic Colonoscope Feeding Unit as Disposable Adapter for Standard Colonoscopic Systems”. 13th United European Gastroenterology Week (UEGW) Copenhagen, Denmark, 2005.
- **S. Schulz**, C. Pylatiuk, A. Kargov, R. Oberle, H. Klosek, T. Werner, W. Rößler, H. Breitwieser, G. Bretthauer: “Fluidically driven robots with biologically inspired actuators”, 8th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines, CLAWAR2005, London, UK, 2005.
- **S. Schulz**, C. Pylatiuk, A.. Kargov, R. Oberle: Artificial fluidic hand, S. 118-119, Beitrag in: O.Ivlev, C. Martens, A. Gräser: Rehabilitation Robots FRIEND-1 and FRIEND-II with the dextrous lightweight manipulator. Technology and Disability 17, S. 111-123, 2005.
- **S. Schulz**, C. Pylatiuk, A.. Kargov, R.Oberle, H. Klosek, T. Werner, R. Rößler: „Development of a Multifunctional Cosmetic hand Prothesis”. Fachzeitschrift OT 8/2006, ISSN 0340-5591, Bundesverband für Orthopädie-Technik, Dortmund, 2006.

“Fluidic Lightweight Robot Systems“

Abstract :

A new approach of lightweight modular robots which are actuated pneumatically or hydraulically will be presented. The design and properties including control aspects of new fluidically driven joint modules will be presented. Some of their applications include prosthetic hands, anthropomorphic robot hands and lightweight robot forearms. They offer favourable properties for robot/human interaction due to their compliance and good power to weight ratio. Therefore, our aim is to build an inexpensive, lightweight modular humanoid robot with good dynamical properties.