

## Shivesh Kumar, M.Sc.

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German Research Center for Artificial Intelligence (DFKI)

Robotics Innovation Center

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Shivesh Kumar is a researcher in the Robot Control team at the DFKI Robotics Innovation Center, Bremen. He obtained his Masters degree in Control Engineering, Robotics, and Applied Informatics with specialization in Advanced Robotics from Ecole Centrale de Nantes, France in 2015. He was also an Erasmus Mundus scholar there. Priorly, he holds a Bachelor in Technology degree in Mechanical Engineering from National Institute of Technology Karnataka, India in 2013. His research interests spans kinematics, dynamics and control of serial, parallel and hybrid robots with applications in the fields of exoskeletons, humanoids, rehabilitation and industrial automation. Recently, he has also been interested in screw theory and algebraic geometry based methods for the analysis of Parallel Kinematic Machines (PKMs). During September 2017, he was also a visiting researcher with Prof. Andreas Mueller at Institute of Robotics, Johannes Kepler University, Linz, Austria.

# CURRICULUM VITAE

## Shivesh Kumar, M.Sc.

### 1. General Information

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### 2. Academic Education and Degrees

2013 - 2015	Master of Science in Control Engineering, Robotics and Applied Informatics (Advanced Robotics Track), Ecole Centrale de Nantes, France
2009 - 2013	Bachelor of Technology in Mechanical Engineering, National Institute of Technology Karnataka, Surathkal, India
2009	All India Senior School Certificate Examination, CBSE Delhi, India
2007	All India Secondary School Examination, CBSE Delhi, India

### 3. Occupational Career since Graduation

2015 - Present	Researcher, Robotics Innovation Center, DFKI GmbH
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### 4. Awards and Honors

- 2<sup>nd</sup> prize in Best Oral Presentations at AIR 2017 conference sponsored by Springer.
- Erasmus Mundus HERITAGE scholarship for pursuing M.Sc. in Advanced Robotics degree at Ecole Centrale de Nantes, France during 2013-2015.
- Conference grant from Function Dynamics India Pvt. Ltd. for presenting my paper in Asian Conference on Multi-body Dynamics (ACMD) 2012 in Shanghai, China.
- DAAD-IAESTE scholarship for research stay at Institute of Mechatronics and Dynamics, University of Paderborn during May to July 2012.
- CBSE Central Sector Scholarship for pursuing B. Tech. degree in Mechanical Engineering at NITK Surathkal, India during 2009-2013.

### 5. Invited Talks/Lectures

- Modular and Distributable approach towards Kinematic and Dynamic modeling of series-parallel Hybrid robots, 11<sup>th</sup> September 2018 at Institut für Robotik und Prozessinformatik, TU Braunschweig, Germany.
- Design, analysis and control of a novel almost spherical mechanism Active Ankle, In Kinematics, Dynamics and Mechatronics in Motion Technology - Seminar RWTH Aachen, 06<sup>th</sup> December 2017 at Institut für Getriebetechnik, Maschinendynamik und Robotik, RWTH Aachen, Germany.

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## 6. Main Publications

- [1] Christoph Stoeffler, Shivesh Kumar, Heiner Peters, Olivier Bruels, Andreas Mueller, Frank Kirchner, Conceptual Design of a Variable Stiffness Mechanism in a Humanoid Ankle using Parallel Redundant Actuation, IEEE Humanoids 2018, 06.11.-09.11.2018, Beijing, China.
- [2] Shivesh Kumar; Kai Alexander von Szadkowski; Andreas Müller; Frank Kirchner, HyRoDyn: A Modular Software Framework for Solving Analytical Kinematics and Dynamics of Series-Parallel Hybrid Robots, In IEEE/RSJ International Conference on Intelligent Robots and Systems, (IROS-2018), 01.10.-05.10.2018, Madrid, IEEE/RSJ, series IROS Poster proceedings, pages 1-1, Oct/2018.
- [3] Shivesh Kumar, Abhilash Nayak, Heiner Peters, Christopher Schulz, Andreas Mueller, Frank Kirchner, Kinematic analysis of a novel parallel 2SPRR+1U ankle mechanism in humanoid robot, In: Lenarcic J., Parenti-Castelli V. (eds) Advances in Robot Kinematics 2018. ARK 2018. Springer Proceedings in Advanced Robotics, vol 8. Springer, Cham.
- [4] Shivesh Kumar, Bertold Bongardt, Marc Simnofske, Frank Kirchner, Design and Kinematic Analysis of the Novel Almost Spherical Parallel Mechanism Active Ankle, In Journal of Intelligent & Robotic Systems, Springer Netherlands, 2018.
- [5] Shivesh Kumar, Marc Simnofske, Bertold Bongardt, Andreas Mueller, Frank Kirchner, Integrating Mimic Joints into Dynamics Algorithms – Exemplified by the Hybrid Recupera Exoskeleton, In Proceedings of the 2017 Conference on Advances In Robotics, (AIR-2017), 28.6.-02.7.2017, New Delhi, ACM-ICPS, 2017.
- [6] Shivesh Kumar, Abhilash Nayak, Bertold Bongardt, Andreas Mueller, Frank Kirchner, Kinematic analysis of Active Ankle using computational algebraic geometry, In Computational Kinematics, (CK-2017), 22.5.-24.5.2017, Poitiers, Springer, 2017.
- [7] Shivesh Kumar, Bertold Bongardt, Marc Simnofske, Frank Kirchner, Task space controller for the novel Active Ankle mechanism, In International Conference on Robotics and Automation for Humanitarian Applications, (RAHA-16), 18.12.-20.12.2016, Amritapuri, Kerala, IEEE, series RAHA 2016 Poster Proceedings, pages 22, Kerala, India, Dec/2016. Amrita University.
- [8] Elsa Andrea Kirchner, Niels Will, Marc Simnofske, Luis Manuel Vaca Benitez, Bertold Bongardt, Mario Michael Krell, Shivesh Kumar, Martin Mallwitz, Anett Seeland, Marc Tabie, Hendrik Wöhrle, Mehmed Yüksel, Anke Heß, Rüdiger Buschfort, Frank Kirchner, “Recupera-Reha – Exoskeleton Technology with Integrated Biosignal Analysis for Sensorimotor Rehabilitation”, In Zweite transdisziplinäre Konferenz zum Thema “Technische Unterstützungssysteme, die die Menschen wirklich wollen“, (smartASSIST-16), 12.12.-13.12.2016, Hamburg, n.n., 2016.
- [9] Shivesh Kumar, Valerie Renaudin, Yannick Aoustin, Eric Le-Carpentier and Christophe Combettes, "Model-based and experimental analysis of the symmetry in human walking in different device carrying modes," 2016 6th IEEE International Conference on Biomedical Robotics and Biomechatronics (BioRob), Singapore, 2016, pp. 1172-1179.
- [10] Marc Simnofske, Shivesh Kumar, Bertold Bongardt, and Frank Kirchner, “Active ankle – an almost-spherical parallel mechanism,” in 47<sup>th</sup> International Symposium on Robotics (ISR), Munich, Germany, 2016.
- [11] Shivesh Kumar, Sensor-less Collision Detection and Isolation, series DFKI Documents, volume 16-01, pages 92-93, Mar/2016. DFKI GmbH.
- [12] Shivesh Kumar, Raghavendra S, Mihir Bhagat, K V Gangadharan, “Modeling and Dynamic Simulation of SHRIMP rover using RecurDyn”, 12th Symposium on Advanced Space Technologies in Robotics & Automation (ASTRA 2013), European Space Agency (ESA), The Netherlands.

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- [13] Shivesh Kumar, Rajeev Lochan C.G., Subir Kumar Saha, "Realistic Modeling and Dynamic Simulation of KUKA KR5 Robot using RecurDyn", 6th Asian Conference on Multi-Body Dynamics, Shanghai, China.
- [14] Rajeev Lochan C.G., Subir Kumar Saha, Shivesh Kumar "Automatic Extraction of DH Parameters from Line Geometry", 2nd Joint International Conference on Multi-Body System Dynamics 2012, Stuttgart, Germany.
- [15] Shivesh Kumar, B Sai Deepak, S M Kulkarni, "Interfacing robotic manipulators with Open-source Computer Aided Drafting packages for Path-Tracing applications", 4th IEEE International Conference on Electronics Computer Technology 2012, Kanyakumari, India.
- [16] Shivesh Kumar, B Sai Deepak, "Design and Implementation of a Card Dealer Robotic Arm", International Conference on Design and Advances in Mechanical Engineering (ICDAAME) 2011, Tiruvannamalai, India.