

# Philipp Tempel

Doctor of Engineering (Engineering Cybernetics)

*There are three things you can give in life: give in, give up, or give everything.*

- Highly self-motivated doctor of engineering with demonstrated research expertise modeling flexible multibody systems
- Rich experience in modeling dynamic systems and computer simulation thereof, using MatLab, MAPLE, Python (Scipy, Sympy)
- Experienced in numerical integration schemes and mechanical integration schemes

## Education

07/2015 to 07/2019

**Doctor of Engineering (Doktoringenieur)**, Cluster of Excellence EXC 310 "Simulation Technology" (SimTech) and Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), University of Stuttgart; Advisor: Andreas Pott, magna cum laude. *Dynamics of Cable-Driven Parallel Robots with Elastic and Flexible, Time-Varying Length Cables*

10/2007 to 03/2013

**Graduate Engineer (Diplomingenieur) Engineering Cybernetics**, University of Stuttgart and University of Delaware, Stuttgart, Germany and Newark, DE, USA; Advisor: Sunil K. Agrawal, very good.

*A Novel Way to Learning to Fly Quadrotors Using a Force Feedback Joystick*

## Appointments

10/2019 to 09/2020

**Postdoctoral Research Associate**, Department of Precision and Microsystems Engineering (PME), Delft University of Technology, Delft, The Netherlands.

12/2013 to 09/2019

**Research Assistant**, Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), University of Stuttgart, Stuttgart, Germany.

04 to 12/2013

**Research Assistant**, Institute of Biomedical Engineering (BMT), University of Stuttgart, Stuttgart, Germany.

## Research Projects

10/2019 to 09/2020

**Cable Robot for the Inspection and Scanning of Artwork**, CaRISA, Faculty of Mechanical, Maritime and Materials Engineering 3mE, Delft University of Technology.

10/2016 to 09/2019

**Integrated Zero Defect Manufacturing Solution for High Value Adding Multi-Stage Manufacturing Systems**, ForZDM, H2020-EU.2.1.5.1; Grant agreement ID: 723698, University of Stuttgart.

01/2014 to 12/2018

**Improved Modeling of Kinematics and Dynamics of Light-Weight Parallel Robots**, Cluster of Excellence EXC 310 "Simulation Technology" (SimTech), University of Stuttgart.

10/2015 to 12/2017

**Development of a Hybrid System of Battery and Capacitor**, FastStorageBW2 , State of Baden-Württemberg, University of Stuttgart.

09/2016 to 05/2017

**Automation and Digitalization in Manufacturing of Control Cabinets**, survey, Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), University of Stuttgart.

04/2014 to 03/2015

**Cable Robots for the German Pavilion at World Expo 2015 in Milan, Italy**, Expo 2015, Ministry for Finance and Economics Baden-Württemberg, University of Stuttgart.

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05 to 12/2013 **Design and Implementation of Lab Session for Measurement of Otoacoustic Emissions and Electrical Impedance Tomography**, Institute of Biomedical Engineering (BMT), University of Stuttgart.

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## Grants

- 2018 **Understanding and improving performance of cable-driven parallel robots through modeling, simulation, and experiments**, *UnIPerRo*, Deutsche Forschungsgemeinschaft DFG (German Research Foundation) and Agence Nationale de la Recherche ANR (French National Research Agency), defeated.
- 2016 **Kinematic Modeling of Cable-Driven Parallel Robots with Unlimited Rotational Axis**, *Endless-Z*, Deutsche Forschungsgemeinschaft DFG (German Research Foundation), project number 358142701.
- 2015 **Development of a Method and Strategy for On-Line Reconfiguration of Cable-Driven Parallel Robots as Handling Devices**, *CaroCtrlConf*, Deutsche Forschungsgemeinschaft DFG (German Research Foundation), project number 317440765.

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## Invited Talks

- 07/2020 **Cable-Driven Parallel Robots: Handling Precious Items from Humans to Cultural Heritage Objects**, *NUACCESS/PIRE International Seminar Series on Cultural Heritage Research: Robotics for the Investigation of Cultural Heritage Objects*, Northwestern University-Art Institute of Chicago Center for Scientific Studies in the Arts (NU-ACCESS) and Partnership in International Research and Education (PIRE), online seminar.
- 03/2018 **Improved Modeling of Kinematics and Dynamics of Cables for Use in Cable-Driven Parallel Robots**, *2nd International Conference on Simulation Technology: Symposium 3 on Dynamical Systems: Reduction, Optimization and Control*, Stuttgart Cluster of Excellence EXC 310 "Simulation Technology" (SimTech), Stuttgart, Germany.
- 02/2018 **The Dynamics of Cable-Driven Parallel Robots with Elastic and Flexible, Time-Varying Length Cables**, *CNU RRI & FhG IPA JRL Cable Robot Colloquium 2018*, Chonnam National University Robotics Research Initiative (CNU RRI) and Fraunhofer Institute for Manufacturing Engineering and Automation (FhG IPA) Joint Robotics Laboratory (JRL), Stuttgart, Germany.
- 02/2016 **Improved Modeling of Cables for Kinematics and Dynamics of Light-Weight Robots**, *CNU RRI & FhG IPA JRL Cable Robot Colloquium 2016*, Chonnam National University Robotics Research Initiative (CNU RRI) and Fraunhofer Institute for Manufacturing Engineering and Automation (FhG IPA) Joint Robotics Laboratory (JRL), Stuttgart, Germany.

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## Teaching

- 10/2015 to 03/2019 **Modeling, Analysis, and Design of New Robot Kinematics**, *Lecture and Tutorials*, University of Stuttgart.
- 10/2017 to 03/2019 **Planning of Robotic Systems**, *Lecture*, University of Stuttgart.
- 10/2014 to 03/2019 **Closed-loop Control of a Feed Axes using MATLAB and Simulink**, *Lab session*, University of Stuttgart.

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## Publications

### Books

- 2019 **P. Tempel**, *Dynamics of Cable-Driven Parallel Robots with Elastic and Flexible, Time-Varying Length Cables*, ser. Stuttgarter Beiträge zur Produktionsforschung. Stuttgart: Fraunhofer Verlag, 2019, vol. 94, ISBN: 978-3-8396-1536-2. DOI: 10.18419/opus-10818.

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## Peer Reviewed Articles

- 2019 C. Reiff, F. Eger, **P. Tempel**, M. C. Magnanini, J. A. Ortiz, M. Colledani, A. Verl, and I. Sarries, "Smart Centering for Rotation-Symmetric Parts in Multi-Stage Production Systems for Zero-Defect Manufacturing," *Procedia CIRP*, vol. 79, pp. 27–32, 2019, ISSN: 2212-8271. DOI: 10.1016/j.procir.2019.02.006.
- 2017 J. Port, Z. Tao, A. Junger, C. Joppek, **P. Tempel**, K. Husemann, F. Singer, P. Latzin, S. Yammine, J. H. Nagel, and M. Kohlhäufl, "A Simple Method to Reconstruct the Molar Mass Signal of Respiratory Gas to Assess Small Airways with a Double-Tracer Gas Single-Breath Washout," *Medical & biological engineering & computing*, vol. 55, no. 11, pp. 1975–1987, 2017. DOI: 10.1007/s11517-017-1633-y. eprint: 28357624.
- 2016 **P. Tempel** and A. Pott, "Parallele Seilroboter in Theorie und Praxis, Leichtbau, Energieeffizienz und hohe Dynamiken als Potential, Elastizität als Hauptherausforderung," *wt Werkstatttechnik online*, vol. 106, no. 9, pp. 643–647, 2016, ISSN: 1436-4980.
- 2015 **P. Tempel**, P. Miermeister, A. Lechler, and A. Pott, "Modelling of Kinematics and Dynamics of the IPAnema 3 Cable Robot for Simulative Analysis," *Applied Mechanics and Materials*, vol. 794, pp. 419–426, 2015, ISSN: 1662-7482. DOI: 10.4028/www.scientific.net/AMM.794.419.
- P. Tempel**, F. Schnelle, A. Pott, and P. Eberhard, "Design and Programming for Cable-Driven Parallel Robots in the German Pavilion at the EXPO 2015," *Machines*, vol. 3, no. 3, pp. 223–241, 2015, ISSN: 2075-1702. DOI: 10.3390/machines3030223.

## Peer Reviewed Conference Proceedings

- 2021 **P. Tempel**, M. Alfeld, and V. van der Wijk, "Design and Analysis of Cable-Driven Parallel Robot CaRISA, a Cable Robot for Inspecting and Scanning Artwork," in *ROMANSY 23 - Robot Design, Dynamics and Control*, Proceedings of the 3rd CISM IFTOMM Symposium (Sapporo, Japan, Sep. 20–24, 2020), G. Venture, J. Solis, Y. Takeda, and A. Konno, Eds., ser. CISM International Centre for Mechanical Sciences, International Centre for Mechanical Sciences and International Federation for the Promotion of Mechanism and Machine Science, vol. 601, Cham: Springer Nature and Springer International Publishing, 2021, pp. 136–144. DOI: 10.1007/978-3-030-58380-4\_17.
- 2020 T. Reichenbach, **P. Tempel**, A. Verl, and A. Pott, "On Kinetostatics and Workspace Analysis of Multi-Platform Cable-Driven Parallel Robots with Unlimited Rotation," in *Robotics and Mechatronics (ISRM 2019)*, Proceedings of the 6th IFTOMM International Symposium on (Taipei, Taiwan, Oct. 28–30, 2019), C.-H. Kuo, P.-C. Lin, T. Essomba, and G.-C. Chen, Eds., ser. Mechanisms and Machine Science, International Federation for the Promotion of Mechanism and Machine Science, vol. 78, Cham: Springer, 2020, pp. 79–90. DOI: 10.1007/978-3-030-30036-4\_7.
- F. Trautwein, T. Reichenbach, **P. Tempel**, A. Pott, and A. Verl, "COPacabana, Ein modularer paralleler Seilroboter," in *Sechste IFTOMM D-A-CH Konferenz 2020*, (Lienz, Austria, Feb. 27–28, 2020), M. Pfurner and F. Dohnal, Eds., International Federation for the Promotion of Mechanism and Machine Science Germany, 2020, ISBN: 978-3-940402-28-8. DOI: 10.17185/duepublico/71189.
- 2019 F. Eger, **P. Tempel**, M. C. Magnanini, C. Reiff, M. Colledani, and A. Verl, "Part Variation Modeling in Multi-Stage Production Systems for Zero-Defect Manufacturing," in *Industrial Technology (ICIT 2019)*, 2019 IEEE International Conference on (Melbourne, VIC, Australia, Feb. 13–15, 2019), Institute of Electrical and Electronics Engineers, IEEE, 2019, pp. 1017–1022. DOI: 10.1109/ICIT.2019.8754964.

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A. Pott and **P. Tempel**, "A Unified Approach to Forward Kinematics for Cable-Driven Parallel Robots Based on Energy," in *Advances in Robot Kinematics (ARK 2018)*, Proceedings of the 2018 16th International Symposium on (Bologna, Italy, Jul. 1–5, 2018), J. Lenarčič and V. Parenti-Castelli, Eds., ed. by B. Siciliano and O. Khatib, ser. Springer Proceedings in Advanced Robotics, International Centre for Mechanical Sciences and International Federation for the Promotion of Mechanism and Machine Science, vol. 8, Cham: Springer, 2019, pp. 401–409, ISBN: 978-3-319-93187-6. DOI: 10.1007/978-3-319-93188-3\_46.

A. Pott, **P. Tempel**, A. Verl, and F. Wulle, "Design, Implementation and Long-Term Running Experiences of the Cable-Driven Parallel Robot CaRo Printer," in *Cable-Driven Parallel Robots (CableCon 2019)*, Proceedings of the Fourth International Conference on (Krakow, Poland, Jul. 1–4, 2019), A. Pott and T. Bruckmann, Eds., ser. Mechanisms and Machine Science, International Federation for the Promotion of Mechanism and Machine Science, vol. 74, Cham: Springer, 2019, ISBN: 978-3-030-20750-2. DOI: 10.1007/978-3-030-20751-9\_32.

T. Reichenbach, **P. Tempel**, A. Verl, and A. Pott, "Static Analysis of a Two-Platform Planar Cable-Driven Parallel Robot with Unlimited Rotation," in *Cable-Driven Parallel Robots (CableCon 2019)*, Proceedings of the Fourth International Conference on (Krakow, Poland, Jul. 1–4, 2019), A. Pott and T. Bruckmann, Eds., ser. Mechanisms and Machine Science, International Federation for the Promotion of Mechanism and Machine Science, vol. 74, Cham: Springer, 2019, ISBN: 978-3-030-20750-2. DOI: 10.1007/978-3-030-20751-9\_11.

**P. Tempel**, D. Lee, F. Trautwein, and A. Pott, "Modeling of Elastic-Flexible Cables with Time-Varying Length for Cable-Driven Parallel Robots," in *Cable-Driven Parallel Robots (CableCon 2019)*, Proceedings of the Fourth International Conference on (Krakow, Poland, Jul. 1–4, 2019), A. Pott and T. Bruckmann, Eds., ser. Mechanisms and Machine Science, International Federation for the Promotion of Mechanism and Machine Science, vol. 74, Cham: Springer, 2019, pp. 295–306, ISBN: 978-3-030-20750-2. DOI: 10.1007/978-3-030-20751-9\_25.

**P. Tempel**, F. Trautwein, and A. Pott, "Experimental Identification of Stress-Strain Material Models of UHMWPE Fiber Cables for Improving Cable Tension Control Strategies," in *Advances in Robot Kinematics (ARK 2018)*, Proceedings of the 2018 16th International Symposium on (Bologna, Italy, Jul. 1–5, 2018), J. Lenarčič and V. Parenti-Castelli, Eds., ed. by B. Siciliano and O. Khatib, ser. Springer Proceedings in Advanced Robotics, International Centre for Mechanical Sciences and International Federation for the Promotion of Mechanism and Machine Science, vol. 8, Cham: Springer, 2019, pp. 258–265, ISBN: 978-3-319-93187-6. DOI: 10.1007/978-3-319-93188-3\_30.

2018 **P. Tempel**, A. Schmidt, B. Haasdonk, and A. Pott, "Application of the Rigid Finite Element Method to the Simulation of Cable-Driven Parallel Robots," in *Computational Kinematics (CK 2017)*, Proceedings of the 7th International Workshop on (Futuroscope-Poitiers, France, May 22–24, 2017), S. Zeghloul, L. Romdhane, and M. A. Laribi, Eds., ser. Mechanisms and Machine Science, Cham: Springer, 2018, pp. 198–205, ISBN: 978-3-319-60867-9. DOI: 10.1007/978-3-319-60867-9\_23.

F. Trautwein, **P. Tempel**, and A. Pott, "A Symbolic-Numeric Method to Capture the Impact of Varied Geometrical Parameters on the Translational Workspace of a Planar Cable-Driven Parallel Robot," in *Reconfigurable Mechanisms and Robots (ReMAR)*, 2018 IEEE International Conference on (Delft, Netherlands, Jun. 20–22, 2018), J. L. Herder and V. van der Wijk, Eds., Institute of Electrical and Electronics Engineers and International Federation for the Promotion of Mechanism and Machine Science, Piscataway, NJ: IEEE, 2018, pp. 1–7, ISBN: 978-1-5386-6380-6. DOI: 10.1109/REMAR.2018.8449891.

- 2017 **P. Tempel**, P.-E. Hervé, O. Tempier, M. Gouttefarde, and A. Pott, "Estimating Inertial Parameters of Suspended Cable-Driven Parallel Robots, Use Case on CoGiRo," in *Robotics and Automation (ICRA 2017)*, 2017 IEEE/RAS International Conference on (Singapore, Singapore, May 29–Jun. 3, 2017), IEEE Robotics and Automation Society, IEEE, 2017, pp. 6093–6098, ISBN: 978-1-5090-4633-1. DOI: 10.1109/ICRA.2017.7989723.
- 2016 **P. Tempel**, A. Verl, and A. Pott, "On the Dynamics and Emergency Stop Behavior of Cable-Driven Parallel Robots," in *ROMANSY 21, Robot Design, Dynamics and Control*, Proceedings of the 21st CISM-IFToMM Symposium (Udine, Italy, Jun. 20–30, 2016), V. Parenti-Castelli and W. Schiehlen, Eds., ed. by F. Pfeiffer, F. G. Rammerstorfer, E. Guazzelli, B. Schrefler, and P. Serafini, ser. CISM International Centre for Mechanical Sciences, International Centre for Mechanical Sciences and International Federation for the Promotion of Mechanism and Machine Science, vol. 569, Cham: Springer, 2016, pp. 431–438, ISBN: 978-3-319-33713-5. DOI: 10.1007/978-3-319-33714-2\_48.
- 2015 **P. Tempel**, P. Miermeister, and A. Pott, "Kinematics and Dynamics Modeling for Real-Time Simulation of the Cable-Driven Parallel Robot IPAnema 3," in *Mechanism and Machine Science 2015*, Proceedings of the 14th IFToMM World Congress on (Taipei, Taiwan, Oct. 25–30, 2015), International Federation for the Promotion of Mechanism and Machine Science, vol. 2, airiti Library, 2015, pp. 117–123. DOI: 10.6567/IFToMM.14TH.WC.OS4.020.

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## Supervised Student Theses

- 2019 C. Bauer, "Inbetriebnahme eines parallelen Seilroboters," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2019.
- 2018 A. Dast, "Integration einer IMU in die Steuerung eines parallelen Seilroboters zur verbesserten Onlinezustandsschätzung," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2018.
- D. Huang, "Comprehensive Experimental Assessment of the Stress-Strain-Dynamics of Dyneema," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Student Research Project, University of Stuttgart, Stuttgart, Germany, 2018.
- D. Lee, "Hefty Cable Dynamics Modeling with Assumed Mode for Cable-Driven Parallel Robots," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Master's Thesis, University of Stuttgart, Stuttgart, Germany, 2018.
- Y. Yang, "Entwicklung einer Simulationsumgebung zur SiL- und HiL-Simulation paralleler Seilroboter in ISG virtuos," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Student Research Project, University of Stuttgart, Stuttgart, Germany, 2018.
- 2017 K. Salzmann, "Konzeption, Entwicklung und Inbetriebnahme eines Prüfstandes zur Klassifizierung und Parameteridentifikation von Kunststofffaserseilen zur Anwendung bei parallelen Seilrobotern," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Student Research Project, University of Stuttgart, Stuttgart, Germany, 2017.
- V. Schmidt, "Konzeption eines Prüfstandes zur Klassifizierung und Parameteridentifikation von Kunststofffaserseilen zur Anwendung bei parallelen Seilrobotern," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2017.
- 2016 R. Lodwig, "Experimentelle Untersuchung des Verhaltens eines Seilroboters bei selbst- und fremderregten Schwingungen," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Diploma Thesis, University of Stuttgart, Stuttgart, Germany, 2016.
- C. Michalkowski, "Enhancing the Kinetostatic Model of Cable-Driven Parallel Robots to Analyze Modes of Vibration of a 1R2T Cable Cobot," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2016.
- 2015 J. Birkenbach, "Recherche und Untersuchung zur Medienversorgung der mobilen Plattform von Seilrobotern," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2015.
- S. Breunig, "Entwicklung eines kameragestützten Verspannungsprozesses für Seilroboter mit Seilkraft- und kartesischer Positionsregelung," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2015.
- T. Kauffmann, "Konstruktion und Inbetriebnahme eines teilautomatisierten Referenziergestells für Seilroboter," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), master thesis, University of Stuttgart, Stuttgart, Germany, 2015.

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L. Neudorfer, "Erstellen eines kinematischen und dynamischen Simulationsmodells inklusive Visualisierung des IPAnema3 unter Nutzung der Physics-Engine aus Blender," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2015.

C. Sigle, "Entwicklung eines pythonbasierten Simulationsmodells der Kinematik und Dynamik von Seilrobotern am Beispiel des IPAnema," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2015.

H. Tran, "Entwicklung eines Eingabegeräts auf Basis intertialbasierter Sensoren zur Manipulation der Pose des Endeffektors von Seilrobotern," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2015.

T. Willkens, "Modellierung, Parametrisierung und Parametrierung eines Seilroboterantriebs," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2015.

D. Zhu, "Modellierung der Kinematik und Dynamik vollverspannter Seilrobotern mittels Port-Based Modelling in Matlab Simscape," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Master's Thesis, University of Stuttgart, Stuttgart, Germany, 2015.

- 2014 L. Schelbert, "Modellieren, Parametrisieren und Parametrieren eines Seilroboterantriebs," Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), Bachelor's Thesis, University of Stuttgart, Stuttgart, Germany, 2014.

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## Organization of Conferences, Workshops, etc.

- 2020 Member of organizing committee of the *9th International Summer School on Screw-Theory Based Methods in Robotics*, Delft, the Netherlands, 07/25 to 08/02/2020.

## Reviewer Activities

- Journals
- Applied Sciences, *MDPI applsci*
  - Asian Journal of Control, *Wiley ASJC*
  - IEEE Robotics and Automation Letters, *IEEE RA-L*
  - IEEE Transactions on Industrial Electronics, *IEEE TIE*
  - IEEE Transactions on Robotics, *IEEE T-RO*
  - IEEE/ASME Transactions on Mechatronics, *IEEE/ASME TMECH*
  - Journal of Mechanisms and Robotics, *ASME JMR*
  - Journal of Robotics, *Hindawi JR*
  - Mathematical Problems in Engineering, *Hindawi MPE*
  - Mechanism and Machine Theory, *Elsevier MechMT*
  - Multibody System Dynamics, *Springer MUBO*
  - Robotics and Autonomous Systems, *Elsevier ROBOT*
  - Symmetry, *MDPI symmetry*
- Conferences
- CISM IFToMM Symposium on Robot Design, Dynamics and Control *ROMANSY*: 2017, 2019
  - European Conference on Mechanism Science *EUCOMES*: 2017
  - IEEE International Conference on Intelligent Robots and Systems *IROS*: 2014, 2016, 2018, 2019
  - IEEE International Conference on Robotics and Automation *ICRA*: 2014, 2016, 2017, 2018, 2019
  - IFToMM International Workshop on Computational Kinematics *CK*: 2016, 2018
  - International Conference on Cable-Driven Parallel Robots *CableCon*: 2014, 2017, 2019
  - International Symposium Advances in Robot Kinematics *ARK*: 2016, 2018

## Professional Affiliations

- since 03/2018 IEEE
- since 03/2018 IEEE Robotics and Automation Society (IEEE/RAS)
- since 01/2018 IEEE Young Professionals
- since 01/2018 Wikimedia Germany e.V.

## References

- Volkert van der Wijk Assistant professor in fast-moving dynamically balanced robotics , Department of Precision and Microsystems Engineering (PME), Delft University of Technology, v.vanderwijk@tudelft.nl.
- Andreas Pott Assistant professor and doctoral advisor, Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW), University of Stuttgart, andreas.pott@isw.uni-stuttgart.de.
- Marc Gouttefarde CNRS research scientist, Team DEXTER, Robotics Department at Laboratory of Informatics, Robotics and Microelectronics (LIRMM), Montpellier, France marc.gouttefarde@lirmm.fr.

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