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Education:

PhD, Mechanical Engineering, Vrije Universiteit Brussel, October 2020
Thesis: Design and Validation of Active Elastic Transfemoral Prostheses

PhD Student, Mechanical Engineering, Michigan State University, December 2009 – Spring 2012

MS Mechanical Engineering, Michigan State University, December 2009
Published thesis: Active Synthetic Wheel Prismatic Joint Biped. Non-linear, Hybrid dynamics control of a planar biped robot.

BS in Mechanical Engineering, emphasis: Mechatronics, December 2002
University of Southern California, Los Angeles, CA

Experience:

Post-Doctoral Researcher, Vrije Universiteit Brussel, Brussels, Belgium
January 2021 – Present
Prosthetics and Exoskeletons, design and control. Project writing.

University of Groningen, Groningen, Netherlands
September 2006 – June 2007
Fulbright fellowship to study bird wing dynamics and the possible applications in science and engineering.

University of Pennsylvania, Philadelphia, PA
June 2004 – August 2006
Research Engineer, University of Pennsylvania Biology, with Dr. Lawrence Rome

Alfred E. Mann Institute for Biomedical Engineering, Los Angeles, CA
September 1999 – July 2003 Sr. Lab Technician http://ami.usc.edu/

Publications:

All time h-index: 14, i10-index: 18, 1323 citations (2022)

2021:

M. Rossini *et al*., "Design and Evaluation of a Passive Cable-Driven Occupational Shoulder Exoskeleton," in *IEEE Transactions on Medical Robotics and Bionics*, vol. 3, no. 4, pp. 1020-1031, Nov. 2021, doi: 10.1109/TMRB.2021.3110679.

Flynn, L. (2021). Compliant Actuation for Transfemoral Prostheses: The CYBERLEGS Prosthesis. In: Beckerle, P., Sharbafi, M.A., Verstraten, T., Pott, P.P., Seyfarth, A. (eds) Novel Bioinspired Actuator Designs for Robotics. Studies in Computational Intelligence, vol 888. Springer, Cham. https://doi.org/10.1007/978-3-030-40886-2_11

Ghillebert, J., Geeroms, J., Flynn, L., De Bock, S., Govaerts, R., Lathouwers, E., . . . De Pauw, K. (2021). Performance of the CYBERLEGs motorized lower limb prosthetic device during simulated daily activities. *Wearable Technologies, 2*, E15. doi:10.1017/wtc.2021.15

2020:

Flynn, L. (2020). *Design and validation of active elastic transfemoral prostheses*. (PhD Thesis)

L. Flynn, J. Geeroms, S. Heins, B. Vanderborght and D. Lefeber, "Estimation of Energy Minimizing Series Elastic Spring Stiffness for an Active Knee Prosthesis," *2020 8th IEEE*

RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob), 2020, pp. 459-464, doi: 10.1109/BioRob49111.2020.9224393.

S. Heins, L. Flynn, H. Laloyaux, J. Geeroms, D. Lefeber and R. Ronsse, "Compliant Control of a Transfemoral Prosthesis by combining Feed-Forward and Feedback," *2020 8th IEEE RAS/EMBS International Conference for Biomedical Robotics and Biomechatronics (BioRob)*, 2020, pp. 452-458, doi: 10.1109/BioRob49111.2020.9224434.

J. Geeroms, L. Flynn, V. Ducastel, B. Vanderborght and D. Lefeber, "On the use of (lockable) parallel elasticity in active prosthetic ankles," *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020, pp. 3383-3388, doi: 10.1109/IROS45743.2020.9341679.

2019:

The efficacy of a motorized lower-limb prosthetic device: a pilot study
Ghillebert, J., Geeroms, J., Flynn, L., De Bock, S., Crea, S., vitiello, N., Lefeber, D., Roelands, B., Meeusen, R. & De Pauw, K., 23 Nov 2019.

Guidelines and recommendations to investigate the efficacy of a lower-limb prosthetic device: a systematic review
Ghillebert, J., De Bock, S., Flynn, L., Geeroms, J., Tassignon, B., Roelands, B., Lefeber, D., Vanderborght, B., Meeusen, R. & De Pauw, K., 30 Oct 2019, In : Transactions on medical robotics and bionics . 4, 1, p. 279-296 17 p.

GUIDELINES AND RECOMMENDATIONS TO EVALUATE A LOWER-LIMB PROSTHETIC DEVICE: A SYSTEMATIC REVIEW
Ghillebert, J., De Bock, S., Flynn, L., Geeroms, J., Tassignon, B., Roelands, B., Lefeber, D., Vanderborght, B., Meeusen, R. & De Pauw, K., 9 Jul 2019, Book of Abstracts 24th Annual Congress of the European College of Sport Science. Prague: European College of Sport Science, p. 669-669 1 p.

2018:

The Challenges and Achievements of Experimental Implementation of an Active Transfemoral Prosthesis Based on Biological Quasi-Stiffness: The CYBERLEGs Beta-Prosthesis
Flynn, L., Geeroms, J., Jimenez-Fabian, R., Heins, S., Vanderborght, B., Munih, M., Molino-Lova, R., Vitiello, N. & Lefeber, D., 4 Dec 2018, In : Frontiers in Neurorobotics. 12, p. 1-20 20 p.

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Verstraten, T., Flynn, L., Geeroms, J., Vanderborght, B. & Lefeber, D., 11 Oct 2018, BIOROB 2018 - 7th IEEE International Conference on Biomedical Robotics and Biomechatronics. IEEE, Vol. 2018-August. p. 720-725 6 p. 8487656. (Proceedings of the IEEE RAS and EMBS International Conference on Biomedical Robotics and Biomechatronics; vol. 2018-August).

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VALIDATION OF THE CYBERLEGS ACTIVE TRANSFEMORAL PROSTHESIS (ATP) DURING VARIED AMBULATION TASKS
Flynn, L., Geeroms, J. & Lefeber, D., 20 Sep 2018, ISPO International Central European ISPO conference 2018 Book of Abstracts. Ljubljana, Slovenia: ISPO Slovenia, p. 77-77 1 p.

Torque Control of an Active Elastic Transfemoral Prosthesis via Quasi-Static Modelling

Heins, S., Flynn, L., Geeroms, J., Lefeber, D. & Ronsse, R., Sep 2018, In : Robotics and Autonomous Systems. 107, p. 100-115 16 p.

Energetic analysis and optimization of a MACCEPA actuator in an ankle prosthesis: Energetic evaluation of the CYBERLEGs alpha-prosthesis variable stiffness actuator during a realistic load cycle
Geeroms, J., Flynn, L., Jimenez-Fabian, R., Vanderborght, B. & Lefeber, D., 8 Jan 2018, In : Autonomous Robots. 42, 1, p. 147-158 12 p.

VUB-CYBERLEGs CYBATHLON 2016 Beta-Prosthesis: case study in control of an active two degree of freedom transfemoral prosthesis
Flynn, L., Geeroms, J., van der Hoeven, T., Vanderborght, B. & Lefeber, D., 3 Jan 2018, In : Journal of NeuroEngineering and Rehabilitation. 15, 1, p. 1-16 16 p., 3.

2017:

Reduction of the torque requirements of an active ankle prosthesis using a parallel spring
Jimenez-Fabian, R., Geeroms, J., Flynn, L., Vanderborght, B. & Lefeber, D., Jun 2017, In : Robotics and Autonomous Systems. 92, p. 187-196 10 p.

Whole body awareness for controlling a robotic transfemoral prosthesis
Parri, A., Martini, E., Geeroms, J., Flynn, L., Pasquini, G., Molino Lova, R., Lefeber, D., Kamnik, R., Munih, M. & Vitiello, N., 30 May 2017, In : Frontiers in Neuroscience. 11, MAY, p. 25 14 p., 25.

The Ankle Mimicking Prosthetic Foot 3 - Locking Mechanisms, Actuator Design, Control and Experiments with an Amputee
Cherelle, P., Grosu, V., Vanderborght, B., Lefeber, D., Flynn, L., Junius, K. & Moltedo, M., 1 May 2017, In : Robotics and Autonomous Systems. 91, p. 327-336 10 p.

Design and energetic evaluation of a prosthetic knee joint actuator with a lockable parallel spring.
Geeroms, J., Flynn, L., Jimenez-Fabian, R., Vanderborght, B. & Lefeber, D., Apr 2017, In : Bioinspiration & Biomimetics. 12, 2, p. 1-13 13 p., 026002.

CYBERLEGs Beta-Prosthesis: Testing and Cybathlon
Flynn, L., Geeroms, J., Vanderborght, B. & Lefeber, D., 8 Mar 2017, Current Directions in Biomedical Engineering: Joint Journal of the German Society for Biomedical Engineering in VDE and the Austrian and Swiss Societies for Biomedical Engineering. s1 ed. Vol. 3. p. s14 1 p.

2016:

On the importance of a motor model for the optimization of SEA-driven prosthetic ankles
Verstraten, T., Mathijssen, G., Geeroms, J., Flynn, L., Vanderborght, B. & Lefeber, D., 5 Oct 2016, Wearable Robotics: Challenges and Trends: Proceedings of the 2nd International Symposium on Wearable Robotics, WeRob2016, October 18-21, 2016, Segovia, Spain. 1 ed. Springer International Publishing, Vol. 16. p. 403-407 5 p. (Biosystems & Biorobotics).

2015:

Ankle-Knee Prosthesis with Active Ankle and Energy Transfer: Development of the CYBERLEGs Alpha-Prosthesis
Flynn, L., Geeroms, J., Jimenez Fabian, R. E., Vanderborght, B., Vitiello, N. & Lefeber, D., 1 Nov 2015, In : Robotics and Autonomous Systems. 73, p. 4-15

CYBERLEGS Beta-Prosthesis active knee system
Flynn, L., Geeroms, J., Jimenez Fabian, R. E., Vanderborght, B. & Lefeber, D., 11 Aug 2015, Rehabilitation Robotics (ICORR), 2015 IEEE International Conference on. IEEE, p. 410-415 5 p.

Sliding-bar MACCEPA for a powered ankle prosthesis
Jimenez Fabian, R. E., Flynn, L., Geeroms, J., Vitiello, N., Vanderborght, B. & Lefeber, D., 6 Mar 2015, In : Journal of Mechanisms and Robotics. 7, 4, 11 p.

2014:

CYBERLEGS - A User-Oriented Robotic Transfemoral Prosthesis with Whole-Body Awareness Control
Ambrozic, L., Gorsic, M., Geeroms, J., Flynn, L., Molino-Lova, R., Kamnik, R., Munih, M. & Vitiello, N., 18 Dec 2014, In : IEEE Robotics and Automation Magazine. 21, 4, p. 82-93 12 p.

Design, development and testing of a lightweight and compact locking mechanism for a passive knee prosthesis.
Geeroms, J., Flynn, L., Jimenez Fabian, R. E., Vanderborght, B., Vitiello, N. & Lefeber, D., 15 Aug 2014, Proceedings of the 5th IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics. p. 1016-1021

Introduction to CYBERLEGs: Hardware and Control
Flynn, L., Giovacchini, F., Ambrozic, L., Gorsic, M., Munih, M., Ruiz-Garate, V., Collard, J. F., Ronsse, R., Molino-Lova, R., Vannetti, F., Geeroms, J., Jimenez Fabian, R. E., Vanderborght, B., Lefeber, D. & Vitiello, N., 2014.

Overview of the design and operating principles of the CYBERLEGs alpha and beta prostheses
Geeroms, J., Flynn, L., Jimenez Fabian, R. E., Vanderborght, B. & Lefeber, D., 2014.

2013:

Ankle-Knee Prosthesis with Powered Ankle and Energy Transfer for CYBERLEGs α-Prototype
Flynn, L., Geeroms, J., Jimenez Fabian, R. E., Vanderborght, B. & Lefeber, D., 28 Jun 2013, Towards Active Lower Limb Prosthetic Systems: Design Issues and Solutions Workshop: Berlin, Germany.

Ankle-Knee Prosthesis with Powered Ankle and Energy Transfer for CYBERLEGs alfa-Prototype.
Geeroms, J., Flynn, L., Jimenez Fabian, R. E., Vanderborght, B. & Lefeber, D., 26 Jun 2013, 13th IEEE International Conference on Rehabilitation Robotics (ICORR), Seattle, Washington USA. p. 224-228 5 p.

The CYBERLEGs alpha-Prosthesis: Active Transfemoral Prosthesis with Knee to Ankle Energy Transfer - Energy Transfer System Design
Geeroms, J., Flynn, L., Jimenez Fabian, R. E., Vanderborght, B. & Lefeber, D., 8 Apr 2013, SYMPOSIUM: Rehabilitation Robotics – Clinical Evidence and Technical Developments.

Ankle-Knee Prosthesis with Powered Ankle and Energy Transfer - Development of the CYBERLEGs Alpha-Prototype
Flynn, L., Geeroms, J., Jimenez Fabian, R. E., Vanderborght, B., Vitiello, N. & Lefeber, D., 2013, Proceedings of the International Congress on Neurotechnology, Electronics and Informatics (Neurotechnix 2013). p. 1-6

The CYBERLEGs α-Prosthesis: Active Transfemoral Prosthesis with Knee to Ankle Energy Transfer - Ankle Development
Flynn, L., Geeroms, J., Jimenez Fabian, R. E., Vanderborght, B. & Lefeber, D., 2013, SYMPOSIUM: Rehabilitation Robotics – Clinical Evidence and Technical Developments.

Rouhollah Jafari, Louis L. Flynn, Aren Hellum and Ranjan Mukherjee. Energy-Conserving Gaits for Point-Foot Planar Bipeds: A Five-DOF Case Study. ASME Dynamic Systems and Controls Conference, Palo Alto, California, USA, October 21–23, 2013 ISBN: 978-0-7918-5612-3

2012:

Development of a powered knee-ankle prosthesis for transfemoral amputees
Flynn, L., Geeroms, J., Jimenez Fabian, R. E. & Lefeber, D., 2012, Human Friendly Robotics.

Tomik, P. Nudehi, S. Flynn, L.L. Mukherjee, R. Design, Fabrication and Control of Spherobot: A Spherical Mobile Robot. Journal of Intelligent & Robotic Systems: 1-15. JAN 18 2012.

2010: Flynn, L.L. Jafari, R. Mukherjee R. An Energy Optimal Gait for the MSU Active Synthetic Wheel Biped. ASME Conf. Proc. DSCC2010(3). Paper MoBT6.2. 2010.

Flynn, L.L. Jafari, R. Mukherjee R. Active Synthetic Wheel Biped With Torso. IEEE Transactions on Robotics. 26(5): 816-826 2010.

Flynn, L.L. Jafari, R. Mukherjee R. Design and Control of an Underactuated Three-Link Rolling Biped. IEEE ICRA: 3392-3397. 2010.

2009: Flynn, L.L. Jafari, R. Mukherjee R. Synthetic Wheel Prismatic Joint Biped With Torso. ASME Conf. Proc. DSCC2009(2):747-755 2009

2006: Rome LC, Flynn L, Yoo TD. Biomechanics - Rubber bands reduce the cost of carrying loads NATURE 444 (7122): 1023-1024 DEC 21 2006

2005: Rome LC, Flynn L, Goldman EM, Yoo TD. Generating electricity while walking with loads SCIENCE 309 (5741): 1725-1728 SEP 9 2005

Teaching: Spring Semesters, 2013- 2015. Robotics Exercises.

MA Thesis advisor: Mohammed Ateeq Bagalkot, 2022
Afaque Aftab Sayyed, 2022
Martina Morengo, 2022
Quentin Pierre, 2021
Karim Shhaitly, 2018

MA1 Project advisor: Thomas Meessen, 2019
Matteo Deleuze, 2021

Awards: 2008 NSF Graduate Research Fellowship
2006 Fulbright Scholarship