# Sergio Portolés Díez, PhD

## PERSONAL INFORMATION


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| *Date and Place of Birth:* | 26/09/1987; Bilbao, Spain |
| *I.D. No.:* | 78.946.909-F |
| *Nationality:* | Spanish |
| | 3010 Leuven (Vlaams Brabant), Belgium |
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| *Driving licence:* | B1 (Spain + International) |
| *LinkedIn:* | https://www.linkedin.com/in/sergioportolesdiez/ |


## EXPERIENCE

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| *12/2019 – 2024 (Current)* | Senior roboticist at Intermodalics developing robotics solutions for customer projects involving: navigation, real-time, visual SLAM. |
| *07/2019 – 11/2019* | Postdoc at KU Leuven. Topics: real-time lock-free multithread communication for robotic applications. |
| *05/2017 – 11/2017* | Visiting researcher at Kobe University (research stay) for development of an encountering palpation interface. |
| *01/2012 – 06/2019* | PhD candidate at KU Leuven - Robotic Assisted Surgery lab - on surgical robotics and haptic systems for assistance. |
| *10/2010 – 07/2011* | Visiting student researcher (ERASMUS) at KU Leuven characterizing magnesium alloys for bio-absorbable implants. |
| *09/2007 – 09/2010* | Scholarship assisting research to design new materials for mobility technologies at University of Mondragon. |

## EDUCATION

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| *01/2012 – 06/2019* | **PhD** at KU Leuven, Mechanical Engineering department, PMA division – Robotics group, Robotics Assisted Surgery group. Research topics: Haptics, Haptic devices, Surgical Robotics, Palpation, HCI. |
| *09/2008 – 09/2011* | MSc: **Mechanical Engineer** major on mechanical design in Mondragon Unibertsitatea (Spain) with Degree Project: "Bone regeneration strategy: Characterization of magnesium porous biodegradable scaffolds" with a mark of 9,9 out of 10. |
| *09/2005 – 09/2008* | BSc: Industrial Technical engineer major on mechanics in Mondragon Unibertsitatea (Spain) with Diploma Project: "Design of high friction testing machines for measuring of friction in high adherence systems" with a mark of 9,4 out of 10. |

## LANGUAGES

| | **Speaking** | **Reading** | **Writing** |
|---|---|---|---|
| **Spanish** | Native | Native | Native |
| **English** | Academic | Academic | Academic |
| **Italian** | Fluent | Fluent | Basic |
| **Japanese** | Basic | Basic | Basic |
| **Dutch** | Basic | Basic | Basic |

## INTERESTS

As a robotics engineer, I strive to **develop innovative robotics solutions** that create value and improve the lives of people, professionals and users. I am determined to develop **highly reliable robotics** systems that impact productivity and wellness by **improving daily workflows** of operators. Said enhancements come in a variety of fields such as **logistics**, **aerospace** and **surgical theatres** (OR).
In my latest stage I pursued this goal working with **visual SLAM**, AR **pose estimation**, **wheeled platforms** and ROS/ROS2 infrastructure for **visualization,** including development of communication primitives and data management. As a technology enthusiast I also like exercising good practices for **continuous development**, **testing** and **integration** of software.
In previous research in the medical field, I developed **telesurgical systems** with **haptic feedback** using bilateral controllers to drastically enhance safety and efficiency during surgical interventions. European **research projects** such as CASCADE gave me a context where to introduce guidance schemes and interface for steering robotic endovascular catheters.

## GRANTS

FWO long stay abroad: for 6 months collaboration with Kobe University at Kobe, Japan on a research project about novel encountering-type haptic display.

## TECHNICAL SKILLS

Design of medical devices and mechanical components for precision robotics and haptic devices.
**Embedded software**: Mechatronic elements, interfaces, hardware platforms, and software elements. Development of software interfaces for sensor and actuator, I/O logic.
DAQs: dSpace, National Instruments, Beckhoff, EtherCAT.
**Data analysis**: databases, statistics, probabilistic graphical models, machine-learning.

## IT SKILLS

OS: **Linux** (main working OS), Windows.
Languages: **C++** (main working language), C, Python (numpy, scipy, pandas), lua, MATLAB, block programming (LabView, Simulink)
Version control: **git**, GitHub and GitLab, svn
Mechanical design packages: Solid Works, Solid Edge, AutoCAD Inventor, CATIA
DevOps: **docker** (inc. Dockerfile), Jenskins, GitLab deployment, administration of remote linux server

## TRANSVERSAL SKILLS

I am a resolute person and like to **solve challenging problems**. I think **communication** is a vital pilar to keep a **team united** working towards a common goal. I was often exposed to work different teams within my firm and other **partners** of *international consortium* in many integration tasks spanning from planning, software architecture, to hardware level.
I develop **excellent relations with co-workers** and other people from **different cultural backgrounds** acting as a **culture bridge**. I am pragmatic on resolution of conflicts.

## ADDITIONAL INFORMATION

I organized some social and cultural events at Biteri College aiming at student team building.
I collaborated with recreational activities for the city hall within Bilbao.Gaua initiative on leisure alternatives for young people.
Hobbies: Hiking, 3D editing, passionate reader of Sci-Fi, manga, board games.
Sports: swimming, snowboarding.

## PUBLICATIONS

1. Portoles Diez S., Reynaerts D. (sup.), Vander Poorten E. (sup.) (**2019**). Haptic Feedback for Soft-Tissue Robotic Surgery: from Training Palpation to Haptic Augmentation. PhD Thesis, KU Leuven.

2. Portoles Diez SJ., Borghesan G., Joyeaux L., Meuleman C., Deprest J., Stoyanov D., Ourselin S., Vercauteren T., Reynaerts D., Vander Poorten E. (**2019**). Evaluation of Haptic Feedback on Bimanually Teleoperated Laparoscopy for Endometriosis Surgery. IEEE Trans Biomed Eng doi: 10.1109/TBME.2018.2870542.

3. Portoles Diez SJ., Ahmad MA., Borghesan G., Meuleman C., Vander Poorten EB. (**2018**). Haptic Feedback Helps Surgeons with Different Level of Expertise on Bimanual Laser Surgery. Joint Workshop on New Technologies for Computer/Robot Assisted Surgery. London, 10-11 September 2018 (pp. 43-44).

4. Degreef J., Poliakov V., Gruijthuijsen C., Javaux A., Ahmad MA., Philips J., Portoles Diez S., Vander Poorten E. (**2018**). Evaluating the Benefit of Assistive AR Technology through Eye Tracking in a Surgical Simulation System. In: The Industrial Track of EuroVR 2018 – Proceedings of the 15th Annual EuroVR Conference (32-39). Presented at the EuroVR, London, UK, 23 Oct 2018-24 Oct 2018. ISBN: 9789513886684. (professional oriented).

5. Vander Poorten, E., Tran, P., Devreker, A., Gruijthuijsen, C., Portoles Diez, S., Smoljkic, G., Strbac, V., Famaey, N., Reynaerts, D., Vander Sloten, J., Tibebu, A., Yu, B., Rauch, C., Bernard, F., Kassahun, Y., Metzen, J., Giannarou, S., Zhao, L., Lee, S., Yang, G., Mazomenos, E., Chang, P., Stoyanov, D., Kvasnytsia, M., Van Deun, J., Verhoelst, E., Sette, M., Di Iasio, A., Leo, G., Hertner, F., Scherly, D., Chelini, L., Hani, N., Seatovic, D., Rosa, B., De Praetere, H., Herijgers, P. (**2016**). Cognitive AutonomouS CAtheters Operating in Dynamic Environments. Journal of Medical Robotics Research, 1 (3), 1-25

6. Portoles Diez, S., Vander Poorten, E., Reynaerts, D. (**2015**). "The haptic desk – towards a more natural interface to train surgical palpation tasks." In Leach, R. (Ed.), *Proceedings of the 15 th international conference of the european society for precision engineering and nanotechnology*. euspen. Leuven, 01-05 June 2015 (art.nr. P4.37) (pp. 287-288). Cranfield University, Bedford, MK43 0AL, UK: euspen.

7. Rosa, B., Devreker, A., De Praetere, H., Gruijthuijsen, C., Portoles Diez, S., Gijbels, A., Reynaerts, D., Herijgers, P., Vander Sloten, J., Vander Poorten, E. (**2015**). "Intuitive Teleoperation of Active Catheters for Endovascular Surgery." 2015 *IEEE/RSJ International Conference on Intelligent Robots and Systems*. Hamburg, 28 September - 2 October 2015 (pp. 2617-2624).

8. Portoles Diez, S., Vanbiervliet, P., Rosa, B., Tomassetti, C., Meulemann, C., Vander Poorten, E., Reynaerts, D. (**2015**). "Force Control for Tissue Tensioning in Precise Robotic Laser Surgery." *IEEE International Conference on Robotics and Automation (ICRA)*. Seattle, 26-30 May 2015.

9. Portoles Diez, S., Vanbiervliet, P., Rosa, B., Vander Poorten, E., Reynaerts, D. (**2015**). "Robotic Autotensioning System for Laser Surgery." *Dutch-Belgian Haptics Meeting*. VU University in Amsterdam, 27 March 2015.

10. Portoles Diez, S., Vander Poorten, E., Borghesan, G., Reynaerts, D. (**2014**). "Towards Palpation in Virtual Reality by an Encountered-Type Haptic Screen." In Auvray, M. (Ed.), Duriez, C. (Ed.), *Haptics: Neuroscience, Devices, Modeling, and Applications: Vol. 8618*. EuroHaptics. Versalles, 24-26 June 2014 (pp. 257-265). Berlin Heidelberg: Springer-Verlag.

11. Devreker, A., Portoles Diez, S., Gijbels, A., Rosa, B., Vander Sloten, J., De Praetere, H., Herijgers, P., Vander Poorten, E., Reynaerts, D. (**2014**). "Towards Intuitive Operation of a Robotic Catheter." *Proceedings of the 4th Joint Workshop on New Technologies for Computer/Robot Assisted Surgery*. Genoa, Italy, 14-16 October 2014 (pp. 100-103).

12. Portoles Diez, S., Vander Poorten, E., Goethals, P., Sips, J., Denis, K., Reynaerts, D. (**2014**). "Basic Experiments Fusing Tactile and Kinaesthetic Information for Improved Haptic Perception." *Proceedings Actuator 2014*. Actuator, 23-25 June 2014(art.nr. C6.5).

13. Gruijthuijsen, C., Tran, P., Devreker, A., Portoles Diez, S., Smoljkic, G., Strbac, V., Famaey, N., Vander Poorten, E., Vander Sloten, J., De Praetere, T., Herijgers, P., Kassahun, Y., Tibebu, A., Yu, B., Giannarou, S., Lee, S., Stoyanov, D., Chang, P.,Kvasnytsia, M., Sette, M., Di Iasio, A., Leo, G., Hertner, F., Seatovic, D., Meiser, V. (**2014**). "Reducing Invasiveness of Endovascular Procedures through Smart Catheter Technology – current status of CASCADE developments -." *The Hamlyn Symposium Workshop on Robotically Assisted Endovascular Intervention*.

14. Portoles Diez, S., Willaert, B., Vander Poorten, E., Reynaerts, D. (**2013**). "Spatially distributed stiffness rendering system for handsfree palpation." *Proc, of the 3rd Joint Workshop on New Technologies for Computer/Robot Assisted Surgery*. Joint Workshop on New Technologies for Computer/Robot Assisted Surgery. Verona, 11-13 September 2013 (pp. 82-84).

15. Portoles Diez, S., Vander Poorten, E., Willaert, B., Reynaerts, D. (**2013**). "Natural Palpation through an Encountered-based Kinaesthetic Display System." *Dutch Belgian Haptic Network Meeting*. Leuven, 25 July 2013.

16. Portoles Diez, S., Vander Poorten, E., Yokokohji, Y., Reynaerts, D. (**2012**). "Feeling a Crisp and Rigid Virtual World through an Impulsive Encountered-type Haptic Display." *Proceedings Actuator 2012*. Actuator 2012.

17. L. Bartolome; W. Tato; M. A. Urchegui; J. A. Hernandez; S. J. Portoles; "Initial steps in the definition of a TPU/cast iron contact model by finite element method." *Symposium on the Mechanics of Slender Structures* (3 edition); San Sebastian, **2010**.

18. L. Bartolome; W. Tato; M. A. Urchegui; A Aginagalde J. A. Hernandez; S. J. Portoles; "Análisis del rozamiento TPU/Fundición existente en el contacto en un sistema Cable-Polea." pp. 761-764 *Proc. XI Congreso Nacional de Materiales*; Zaragoza; Spain; **2010**.