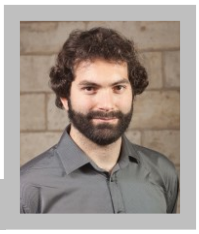

# Sergio Portolés Díez, PhD

## PERSONAL INFORMATION


| | |
|---|---|
| *Date and Place of Birth:* | 26/09/1987; Bilbao, Spain |
| *I.D. No.:* | 78.946.909-F |
| *Nationality:* | Spanish |
| *Address:* | Geldenaaksebaan 16, b-01<br>3001 Heverlee, Leuven (Vlaams Brabant), Belgium |
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| *Email:* | Sergio.PortolesDiez@kuleuven.be sergio.portoles@gmail.com |
| *Driving licence:* | B1 (Spain + International) |
| *LinkedIn:* | https://www.linkedin.com/in/sergioportolesdiez/ |


## EDUCATION

| | |
|---|---|
| *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. |

## EXPERIENCE

| | |
|---|---|
| *07/2012 – 01/2020 (available)* | Researcher as postoc assistant at KU Leuven. Topics: realtime lock-free multithread communication for robotic applications. |
| *01/2012 – 06/2019* | Researcher as doctorandus assistant at KU Leuven. |
| *05/2017 – 11/2017* | Visiting researcher at Kobe University |
| *10/2010 – 07/2011* | Visiting researcher student (ERASMUS) at KU Leuven. |
| *09/2007 – 09/2010* | Scholarship research student involved in the project "MALTRO". High friction and low wear materials at MU (University of Mondragon). |
| *Other* | Several consulting jobs as IT and web pages design. |

## LANGUAGES

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

## RESEARCH INTERESTS

I am interested in haptics and **robotics**. I am determined to develop new **natural rendering interfaces** to increase *immersivity* and *awareness* of the haptic user. I also work on kinaesthetic impedance-controlled interfaces and *tactile displays*, two common haptic modalities that in combination are of special interest for palpation applications in the **medical field**.
I have further particular interest in developing **telesurgical systems** with *haptic feedback*. Telesurgery is another field where bilateral controllers represent a significant added value with great potential to drastically enhance the safety and efficiency of surgeons. Within the CASCADE (www.cascade-fp7.eu) **research project** I developed new guidance schemes and interfaces for steering robotic endovascular catheters. In the frame of RobMoSys (robmosys.eu) H2020 project, I develop a template application as guidelines for the target of software generation tools. Through a bottom-up approach, best practices on robot control are taken into account in aspects of **real-time execution**, concurrent access, inter-thread communication and resource management.

## GRANTS

FWO long stay abroad: for 6 months collaboration with Kobe University at Kobe, Japan on a research project about novel encountered-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

User of: Linux (openSUSE, ubuntu, Debian, Mandriva), Windows (95 – W10)
Languages: C, C++, Python (numpy, scipy, pandas), lua, MATLAB, block programming (LabView, Simulink)
Version control: GIT, svn
Mechanical design packages: Solid Works, Solid Edge, AutoCAD Inventor, CATIA

## TRANSVERSAL SKILLS

I am a resolute person and like to **solve challenging problems**.
Native **team-worker**, on a daily-basis during my research I collaborate with people not only from my laboratory but also with other **partners** on the *international consortium* in many integration tasks spanning from planning to hardware level.
I develop **excellent relations with co-workers** and other people from different cultural backgrounds.
Pragmatic resolution of conflicts.

## ADITIONAL 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: Outdoors hiking, 3D editing.
Sports: snowboarding, swimming

## PUBLICATIONS

1. Portoles Diez S., Reynaerts D. (sup.), Vander Poorten E. (cosup.) (**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**.