



# Sondre Sanden Tørdal

## Curriculum Vitae

### Education

- 2015–2019 **PhD. Mechatronics**, *University of Agder*, Grimstad  
Specialization in robotics, real-time systems and advanced marine load operations.
- 2013–2015 **M.Sc. Mechatronics**, *University of Agder*, Grimstad  
Specialization in hydraulics, real-time systems, PLC programming and system identification
- 2010–2013 **B.Sc. Mechatronics**, *University of Agder*, Grimstad  
Specialization in marine science
- 2009–2010 **Engineering Preparatory Course**, *University of Agder*, Kristiansand
- 2004–2008 **Carpenter**, *Lunde Upper Secondary School*, Lunde

### Work and Voluntary Experience

- 2020- **CEO and Founder**, *MotionTech AS*, Grimstad  
A spin-off company from the SFI Offshore Mechatronics project focusing on robotics and software development.
- 2020-2021 **Associate Professor**, *University of Agder*, Grimstad  
Teaching and research within the fields of robotics and product development using recent trends in software development.
- 2017-2020 **R&D Specialist**, *MacGregor AS*, Arendal  
Extensive software development for robotic applications related to offshore operations including autonomous mooring and load handling.
- 2015 **Summer Intern**, *MacGregor AS*, Kristiansand  
Developed and constructed a hydraulic test setup at the company's test facilities. Hardware and PLC software was developed during the summer internship.
- 2014 **Summer Intern**, *Scana Mar-EL AS*, Dalen  
Introduced LabVIEW as a possible solution to the company's experimental work.
- 2013–2014 **Part Time Student Researcher**, *University of Agder*, Grimstad  
Research aimed at mathematical modeling and simulation of vehicles during impact crashes. During my time in the project I contributed to prepare several scientific papers.
- 2013 **Summer Intern**, *FMC Technologies*, Kongsberg  
Participated in FMC's yearly Summer Trainee Technology Program (STTP). I contributed to the project with a conceptual design of an autonomous seawater battery.
- 2011-2013 **Student Assistant**, *University of Agder*, Grimstad  
Student assistant in the following courses: Calculus, Mathematics 3, Physics, and Mechanics.
- 2011-2013 **Student Mentor**, *University of Agder*, Grimstad  
Student mentor in the following courses: Statistics, Mathematics 1, Mathematics 2, Control Systems Engineering and Mechanical design.

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2011–2013 **Student Contact**, *Tekna*, Grimstad  
Leadership and organizational work.

## Computer Skills

Open-source Python, ROS, OpenCV, Linux, C/C++, C#, Java, HTML, CSS, Unity, PyTorch, and  $\LaTeX$   
Commercial Matlab/Simulink, Maple, SimulationX, LabVIEW, Siemens TIA Portal, SolidWorks, Windows, Structured Text (ST), TwinCAT

## Communication Skills

- 2016 Awarded best session presenter at the annual IECON conference held in the Palazzo dei Congressi, Florence, Italy.
- 2015 Main speaker at annual master graduation ceremony at the University of Agder.
- 2015 Lectured an introductory course in scientific report preparation using the  $\LaTeX$  language.
- 2014 Lectured an introductory course in Matlab programming and introduced the class to simple time-domain simulation of mechanical systems.
- 2013 Oral presentation at the Summer Trainee Technology Program at FMC Kongsberg.

## Language Skills

Norwegian Native language  
English Excellent

## Theses

- Tørddal, S. S. (2019). *Real-time motion compensation in ship-to-ship load handling* (Doctoral dissertation). University of Agder, Grimstad. <https://doi.org/http://hdl.handle.net/11250/2590151>
- Tørddal, S. S., & Klausen, A. (2015). *System identification of a variable piston pump and design of a hydraulic load circuit* (Master's thesis). Universitetet i Agder, Grimstad. <https://doi.org/http://hdl.handle.net/11250/301978>
- Tørddal, S. S., & Klausen, A. (2013). *Dynamiske karakteristikk av brevini HPV41 med åpen og lukket sløyfe regulering* (BA thesis). Universitetet i Agder, Grimstad.

## Journal Papers, level 2

- Tørddal, S. S., & Hovland, G. (2019). Ship-to-ship state observer using sensor fusion and the extended kalman filter. *Journal of Offshore Mechanics and Arctic Engineering*, 141(4), 041603. <https://doi.org/10.1115/1.4041643>

## Journal Papers

- Tørddal, S. S., Olsen, J. T., & Hovland, G. (2018). The norwegian motion-laboratory. *Modeling, Identification and Control*, 39(3), 191–208. <https://doi.org/10.4173/mic.2018.3.5>
- Tørddal, S. S., & Hovland, G. (2017b). Relative vessel motion tracking using sensor fusion, aruco markers, and mru sensors. *Modeling, Identification and Control*, 38(2), 79–93. <https://doi.org/doi:10.4173/mic.2017.2.3>
- Tørddal, S. S., Hovland, G., & Tyapin, I. (2017). Efficient implementation of inverse kinematics on a 6-dof industrial robot using conformal geometric algebra. *Advances in Applied Clifford Algebras*, 27(3), 2067–2082. <https://doi.org/10.1007/s00006-016-0698-2>
- Tørddal, S. S., Klausen, A., & Bak, M. K. (2015). Experimental system identification and black box modeling of hydraulic directional control valve. *Modeling, Identification and Control*, 35(4), 225–235. <https://doi.org/10.4173/mic.2015.4.3>

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Klausen, A., Tørdal, S. S., Karimi, H. R., Robbersmyr, K. G., Jecmenica, M., & Melteig, O. (2014). Firefly optimization and mathematical modeling of a vehicle crash test based on single-mass. *Journal of Applied Mathematics*. <https://doi.org/10.1155/2014/150319>

## Conference Papers

Jakobsen, M. M., Tørdal, S. S., Klausen, A., Robbersmyr, K. G., & Tyapin, I. (2021). Product development and project-based learning in mechatronics, in the context of digitization and sustainability. *MNT konferansen 2021*. <https://doi.org/10.5324/njsteme.v5i1.3946>

Tørdal, S. S., Klausen, A., & Jakobsen, M. M. (2021). Case study: Employing agile tools in teaching product development to mechatronics students. *MNT konferansen 2021*. <https://doi.org/10.5324/njsteme.v5i1.3900>

Heng, O., & Tørdal, S. S. (2017). Calibration of the norwegian motion laboratory using conformal geometric algebra. *CGI '17 Proceedings of the Computer Graphics International Conference*. <https://doi.org/10.1145/3095140.3097285>

Tørdal, S. S., & Hovland, G. (2017a). Inverse kinematic control of an industrial robot used in vessel-to-vessel motion compensation. *25th Mediterranean Conference on Control and Automation (MED)*, 1392–1397. <https://doi.org/10.1109/MED.2017.7984313>

Tørdal, S. S., Løvslund, P.-O., & Hovland, G. (2016). Testing of wireless sensor performance in vessel-to-vessel motion compensation. *Industrial Electronics Society, IECON 2016-42nd Annual Conference of the IEEE*, 654–659. <https://doi.org/10.1109/IECON.2016.7793951>

Klausen, A., Tørdal, S. S., Karimi, H. R., Robbersmyr, K. G., Ječmenica, M., & Melteig, O. (2015). Mathematical modeling and numerical optimization of three vehicle crashes using a single-mass lumped parameter model. *24th International Technical Conference on the Enhanced Safety of Vehicles (ESV)*, (15-0168).

Alenborn, K. A., Klausen, A., Tørdal, S. S., & Karimi, H. R. (2014). Firefly optimization used to identify hysteresis parameter on rotational mr-damper. *International Conference on Mechatronics and Control (ICMC)*, 2302–2307. <https://doi.org/10.1109/ICMC.2014.7231979>

Klausen, A., Tørdal, S. S., Karimi, H. R., Robbersmyr, K. G., Ječmenica, M., & Melteig, O. (2014). Mathematical modeling and optimization of a vehicle crash test based on a single-mass. *Proceeding of the 11th World Congress on Intelligent Control and Automation*. <https://doi.org/10.1109/WCICA.2014.7053313>

Tørdal, S. S., Klausen, A., Karimi, H. R., Robbersmyr, K. G., Ječmenica, M., & Melteig, O. (2014). On detection of yaw and roll angle information for vehicle oblique crash using hough transform. *Proceeding of the 11th World Congress on Intelligent Control and Automation*, 5951–5955. <https://doi.org/10.1109/WCICA.2014.7053739>

## Patents

Tørdal, S. S., & Høvik, J. (2020). *Pile installation facility and methods thereof* (WO2021245175A1). <https://patents.google.com/patent/WO2021245175A1>

Stensland, E. G., Flateland, K. I., Albrigtsen, R. H., Tørdal, S. S., Tomstad, A. S., Løvslund, P.-O., Ugland, E., & Hansen, K. H. (2019). *Multiaxial robotic arm* (NO345105B1). <https://patents.google.com/patent/NO345105B1>

## Supervision Experience

Hansen Kruithof, K., & Egeland, M. (2021). *State estimator using hybrid kalman and particle filter for indoor uav navigation* (Master's thesis) [Master Thesis]. University of Agder, Grimstad.

Nilsen, J. (2021). *Tapping beam recognition and measurement with infrared camera* (Master's thesis) [Master Thesis]. University of Agder, Grimstad.

Skotterud, T., Dale, J., Sand, K., & Myrland, G. (2021). *Development of a portable stewart platform for demonstrations and educational purposes* (BA thesis). Universitetet i Agder, Grimstad.

Olsen, J. T. (2018). *Simulation and control of an anti-swing system for a suspended load attached to a moving base robot* (Master's thesis) [Master Thesis]. University of Agder, Grimstad.

- Heng, O. (2017). *Kinematic modeling and calibration of the norwegian motion laboratory using conformal geometric algebra* (Master's thesis) [Master Thesis]. University of Agder, Grimstad.
- Sjøberg, A. M. (2016). *6 dof real-time pose estimation using microsoft kinect 2* (Master's thesis) [Master Thesis]. University of Agder, Grimstad.
- Størbu, J., Lunde, K. M., Eggebø, S., & Langhaug, O. H. (2016). *Hydraulic actuated inverted pendulum* (BA thesis). Universitetet i Agder, Grimstad.