# Hanwool WOO

Room #408, Building #GII, Akita Prefectural University
Yurihonjo-shi, Akita, 015-0055
Tel: 080-3912-3451
Email: woo@akita-pu.ac.jp

## Career

**ASSISTANT PROFESSOR, AKITA, JAPAN : 04/2019-**

Department of Intelligent Mechatronics, Faculty of Systems Science and Technology, Akita Prefectural University

**VISITING RESEARCHER, TOKYO, JAPAN : 04/2019-**

Department of Precision Engineering, Graduate School of Engineering, University of Tokyo

**JSPS POSTDOCTORAL FELLOWSHIP RESEARCHER, TOKYO, JAPAN : 04/2018-03/2019**

Department of Precision Engineering, Graduate School of Engineering, University of Tokyo

**JUNIOR RESEARCHER, LG ELECTRONICS, SEOUL, KOREA : 10/2010-8/2014**

Development of home robots: vacuum cleaning robot, lawnmower robot, window cleaning robot

## Education

| | |
|---|---|
| 04/2015 - 03/2018 | The University of Tokyo, Tokyo, Japan |
| | Ph. D., Department of Precision Engineering |
| | Graduate School of Engineering |
| 10/2008 - 09/2010 | The University of Tokyo, Tokyo, Japan |
| | M.S., Department of Advanced Energy |
| | Graduate School of Frontier Sciences |
| 04/2004 - 03/2008 | The University of Tokyo, Tokyo, Japan |
| | B.S., Department of Aeronautics and Astronautics |
| | Faculty of Engineering |

## Award

| | | |
|---|---|---|
| 03/2018 | Graduate School Research Award | Society of Automotive Engineers of Japan |
| 12/2016 | Best Presentation Award | The 17th SICE System Integration Division Annual Conference |

# Hanwool Woo

# Publication

## JOURNAL

[1] **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Trajectory Prediction of Surrounding Vehicles Considering Individual Driving Characteristics", *International Journal of Automotive Engineering (IJAE)*, 2018. (Accepted)

[2] **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Dynamic State Estimation of Driving Style Based on Driving Risk Feature", *International Journal of Automotive Engineering (IJAE)*, Vol.9, No.1, pp.31-38, March 2018.

[3] Doyeon Kim, **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "Effect of Detector Pose Uncertainty in Localization of Radiation Sources", *E-Journal of Advanced Maintenance*, Vol. 9, No.2, pp.97-103, August 2017.

[4] **Hanwool Woo**, Yonghoon Ji, Hitoshi Kono, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Lane-Change Detection Based on Vehicle-Trajectory Prediction", *IEEE Robotics and Automation Letters (RA-L)*, Vol.2, No.2, pp.1109-1116, April 2017.

[5] **Hanwool Woo**, Yonghoon Ji, Hitoshi Kono, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Automatic Detection Method of Lane-Changing Intentions Based on Relationship with Adjacent Vehicles Using Artificial Potential Fields", *International Journal of Automotive Engineering (IJAE)*, Vol.7, No.4, pp.127-134, November 2016.

## INTERNATIONAL CONFERENCE

[1] Yusheng Wang, Yonghoon Ji, **Hanwool Woo**, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "Three-dimensional Underwater Environment Reconstruction with Graph Optimization Using Acoustic Camera", *Proceedings of the 2019 IEEE/SICE International Symposium on System Integration (SII2019)*, Paris (France), January 2019. (Accepted)

[2] **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Advanced Adaptive Cruise Control Based on Collision Risk Assessment", *Proceedings of the 21th IEEE International Conference on Intelligent Transportation Systems (ITSC2018)*, pp.939-944, Hawaii (USA), November 2018.

[3] Yusheng Wang, Yonghoon Ji, **Hanwool Woo**, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "3D Occupancy Mapping Framework Based on Acoustic Camera in Underwater Environment", *Proceedings of 12th IFAC Symposium on Robot Control (SYROCO2018)*, Paper No.055, pp.1-7, Budapest (Hungary), August 2018.

[4] Ngoc Trung Mai, Yonghoon Ji, **Hanwool Woo**, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "Acoustic Image Simulator Based on Active Sonar Model in Underwater Environment", *Proceedings of the 15th International Conference on Ubiquitous Robots (UR2018)*, pp.781-786, Honolulu (USA), June 2018.

# Hanwool Woo

[5] Doyeon Kim, **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "3D Radiation Imaging Using Mobile Robot Equipped with Radiation Detector", *Proceedings of the 2017 IEEE/ SICE International Symposium on System Integration (SII2017)*, pp.1-6, Taipei (Taiwan), December 2017.

[6] Ngoc Trung Mai, **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "3D Reconstruction of Line Features Using Multi-view Acoustic Images in Underwater Environment", Proceedings of *the 2017 IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems (MFI2017)*, pp.312-317, Daegu (Korea), November 2017.

[7] **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Driver Classification in Vehicle-Following Behavior by Using Dynamic Potential Field Method", *the 20th IEEE International Conference on Intelligent Transportation Systems (ITSC2017)*, pp.1101-1106, Yokohama (Japan), October 2017.

[8] Ngoc Trung Mai, **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "3-D Reconstruction of Underwater Object Based on Extended Kalman Filter by Using Acoustic Camera Images", Proceedings of *the 20th World Congress of the International Federation of Automatic Control (IFAC2017)*, pp.1066-1072, Toulouse (France), July 2017.

[9] **Hanwool Woo**, Yonghoon Ji, Hitoshi Kono, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Lane-Change Detection Based on Vehicle-Trajectory Prediction", *Proceedings of the 2017 IEEE International Conference on Robotics and Automation (ICRA2017)*, Singapore, May-June 2017. (IEEE Robotics and Automation Letters, Vol.2, No.2, pp.1109-1116, April 2017.)

[10] Doyeon Kim, **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "Localization of Radiation Sources Using Gamma-ray Detector in Simulated Environments", *Proceedings of the 3rd International Conference on Maintenance Science and Technology (ICMST2016)*, Shenzhen (China), November 2016.

[11] **Hanwool Woo**, Yonghoon Ji, Hitoshi Kono, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Lane-Changing Feature Extraction Using Multisensor Integration", *Proceedings of the 16th International Conference on Control, Automation and Systems (ICCAS2016)*, pp.1633-1636, Gyeongju (Korea), October 2016.

[12] **Hanwool Woo**, Yonghoon Ji, Hitoshi Kono, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Dynamic Potential-Model-Based Feature for Lane Change Prediction", *Proceedings of the 2016 IEEE International Conference on Systems, Man, and Cybernetics (SMC2016)*, pp.838-843, Budapest (Hungary), October 2016.

[13] **Hanwool Woo**, Yonghoon Ji, Hitoshi Kono, Yusuke Tamura, Atsushi Yamashita and Hajime Asama: "Detection Method of Lane Change Intentions in Other Drivers Using Hidden Markov Models", *Proceedings of the 6th International Conference on Advanced Mechatronics (ICAM2015)*, pp.253-254, Tokyo (Japan), December 2015.

[14] Kazuhisa Fujita, Syogo Tachibana, Seiji Sugita, Hirdy Miyamoto, Takashi Mikouchi, Toshiyuki Suzuki, Hiroki Takayanagi, Takashi Ozawa, Jyunichiro Kawaguchi, **Hanwool Woo**: "Nonstop Mars Sample Return System Using Aerocapture Technologies", *American Institute of Aeronautics and Astronautics Atmosphere Flight Mechanics Conference*, 2009.

# Hanwool Woo

## DOMESTIC CONFERENCE

[1] 杉本 瑞生, **Woo Hanwool**, 田村 雄介, 山崎 慎也, 黒田 康秀, 菅野 崇, 山本 康典, 山下 淳, 淺間 一: "車線変更が必須である交通環境下における他車の割り込み場所の推定", 第19回計測自動制御学会システムインテグレーション部門講演会講演論文集（2018）, 大阪, December 2018.

[2] 岸本 卓也, **Woo Hanwool**, 田村 雄介, 大島 佑介, 島添 健次, 高橋 浩之, 山下 淳, 淺間 一: "ガンマ線検出器を搭載した移動ロボットによる複数放射線源の分布推定", 第19回計測自動制御学会システムインテグレーション部門講演会講演論文集（2018）, 大阪, December 2018.

[3] 勝間 真弥, **Woo Hanwool**, 田村 雄介, 山下 淳, 淺間 一: "オフライン探索の結果を用いた効率的な再探索を行う不整地移動ロボットの動作計画", 第19回計測自動制御学会システムインテグレーション部門講演会講演論文集（2018）, 大阪, December 2018.

[4] **Hanwool Woo**, Mizuki Sugimoto, Jiaxu Wu, Yusuke Tamura, Atsushi Yamashita, Hajime Asama: "Trajectory Prediction of Surrounding Vehicles Using LSTM Network", 自動車技術会2018春季大会学術講演会講演予稿集, 文献番号20186277, pp.1-4, 名古屋, October 2018.

[5] 湊 真司, ルイ笠原 純ユネス, **禹 ハンウル**, 藤井 浩光, 山下 淳, 淺間 一: "カセンサを用いたコンクリート構造物の変状検出", 第36回日本ロボット学会学術講演会予稿集（RSJ2018）, pp.1-3, September 2018.

[6] **Hanwool Woo**, Yonghoon Ji, Yusuke Tamura, Yasuhide Kuroda, Takashi Sugano, Yasunori Yamamoto, Atsushi Yamashita and Hajime Asama: "Trajectory Prediction of Surrounding Vehicles Considering Individual Driving Characteristics", 自動車技術会2018春季大会学術講演会講演予稿集, 文献番号20185028, pp.1-7, 横浜, May 2018.

[7] **禹 ハンウル**, 池 勇勳, 河野 仁, 田村 雄介, 黒田 康秀, 菅野 崇, 山本 康典, 山下 淳, 淺間 一: "車両挙動分析による先行車追従における運転者の運転行動推定", 自動車技術会2017年春季大会学術講演会講演予稿集, pp.1351-1356, 横浜, May 2017.

[8] 金 度演, **禹 ハンウル**, 池 勇勳, 田村 雄介, 山下 淳, 淺間 一: "コンプトンカメラを搭載した移動ロボットによるSLAMを用いた放射線源の位置推定手法の構築", 日本機械学会ロボティクス・メカトロニクス講演会'17講演論文集（ROBOMECH2017）, 2P1-R06, pp.1-3, 郡山, May 2017.

[9] **禹 ハンウル**, 池 勇勳, 河野 仁, 田村 雄介, 黒田 康秀, 菅野 崇, 山本 康典, 山下 淳, 淺間 一: "車線変更推定法および人工ポテンシャル法を用いた他車の走行軌道予測", 第17回計測自動制御学会システムインテグレーション部門講演会講演論文集 (SI2016), pp.446-451, 札幌, December 2016.

[10] 金 度演, **禹 ハンウル**, 池 勇勳, 田村 雄介, 山下 淳, 淺間 一: "ガンマ線検出器の位置姿勢の不確実性が放射線源の位置推定結果に与える影響のシミュレーション検証", 第17回計測自動制御学会システムインテグレーション部門講演会講演論文集 (SI2016), pp.473-476, 札幌, December 2016.

**Hanwool Woo**

[11] マイ ゴク チュン, **禹 ハンウル**, 池 勇勳, 田村 雄介, 山下 淳, 淺間 一: "音響カメラ画像を用いた拡張カルマンフィルタに基づく水中物体の3次元計測手法の構築", 第34回日本ロボット学会学術講演会予稿集 (RSJ2016), 1C3-06, pp.1-4, 山形, September 2016.

[12] **禹 ハンウル**, 池 勇勳, 河野 仁, 田村 雄介, 山下 淳, 淺間 一, 菅野 崇, 黒田 康秀: "人工ポテンシャル法による周辺車両との関係性を考慮した車線変更推定", 自動車技術会2016年春季大会学術講演会講演予稿集, pp. 1397-1402, 横浜, May 2016.

[13] **禹 ハンウル**, 池 勇勳, 河野 仁, 田村 雄介, 山下 淳, 淺間 一: "状態単位の隠れマルコフモデルを用いた他車の車線変更推定手法", 第21回ロボティクスシンポジア講演予稿集, pp.222-227, 長崎, March 2016.

[14] **禹 ハンウル**, 藤田 和央, 高柳 大樹, 鈴木 俊之: "火星無着陸サンプルリターンミッションにおける空力誘導の総合的評価", 第54回宇宙科学技術連合会, 1J04（JSASS-2010-4134）, 静岡, November 2010.

[15] **禹 ハンウル**, 藤田 和央, 高柳 大樹, 鈴木 俊之: "火星無着陸サンプルリターンミッションにおける軌道投入サクセスレートの評価", 平成21年度宇宙航行の力学シンポジウム, pp.17-20, 神奈川, December 2009.

[16] 藤田 和央, 鈴木 俊之, 高柳 大樹, 尾川 直子, 津田 雄一, 中塚 潤一, **禹 ハンウル**, 古舘 美智子, 川口 淳一郎: "火星無着陸サンプルリターンミッション(MASC)システム検討の現状", 平成21年度宇宙航行の力学シンポジウム, pp.13-16, 神奈川, December 2009.

[17] **禹 ハンウル**, 藤田 和央, 高柳 大樹, 鈴木 俊之: "火星無着陸サンプルリターンミッションにおける空力誘導システムの評価", 第53回宇宙科学技術連合会, 1G14（JSASS-2009-4101）, 京都, September 2009.