# Yoshua Gombo, Ph.D.

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# TECHNICAL EXPERTISE

Specialties	Robotics, controls theory, sensors, machine learning, artificial intelligence, system design
Programming Languages	Python, C/C++, MATLAB/Simulink
Software & Libraries	ROS, Autodesk Inventor, SolidWorks, AutoCAD, ANSYS, CloudCompare, Git, OpenCV
Applied Technical Expertise	Robotics: perception, kinematics, learning; Modeling and estimation: dynamics, Kalman
	filtering, machine learning; <i>Mechanical:</i> system design, 3D modeling, Finite Element Analysis

#### **EDUCATION**

#### **University of Washington**

*Ph.D., Mechanical Engineering (Robotics & Controls) M.S., Mechanical Engineering (Mechatronics)* 

#### **Oregon Institute of Technology**

B.S., Mechanical Engineering, minor in Applied Mathematics and Applied Physics

Seattle, WA December 2023 December 2020

# Klamath Falls, OR

December 2015

# EXPERIENCE

### Konstruksi.Al

Co-founder and Chief Technology Officer

- Managing a team of software engineers and developers for the development of the core product
- Developing and implementing state-of-the-art computer vision artificial intelligence models to detect defects on construction sites
- Collaborating with clients in both private and public sectors for advancing the construction management workflow especially in Indonesia

## **University of Washington**

Graduate Researcher (Advisor: Prof. Santosh Devasia)

- Developed intelligent network-based control methods for multi-robot teams [1, 2, 3, 4]
- Designed system and control architecture for multi-robot teams experiment, incorporating industrial robots (ABB) as well as Arduino-based mobile robots [1]
- Developed data-based machine learning algorithms to enable robot interactions with flexible structures [5, 6]

## **Boeing Advanced Research Center (BARC)**

Robotics and Controls Researcher

- Designed and built a gantry-based mechatronics system for advanced composite manufacturing processes
- Collaborated with Boeing engineers on design of actuators, optimal sensing and control

## **DEKA Research & Development**

Robotics Perception Engineer Intern

• Developed a facial detection functionality for the upcoming autonomous security robots by leveraging computer vision and deep learning approaches

Robotics Engineer Intern

 Improved perception capabilities of autonomous package-delivery robots by integrating 3D object detection feature using computer vision and deep learning techniques from LiDAR point cloud data

# JELD-WEN, Inc.

Product Engineer

- Innovated new composite window products and co-assigned of 20+ US patents
- Assessed the structural integrity of window/door designs using Finite Element Analysis (FEA)

#### Seattle, WA

Seattle, WA

#### June 2019 – December 2023

September 2021 – December 2023

#### Manchester, NH

#### June – September 2023

#### June – September 2022

## Klamath Falls, OR

June 2015 - June 2018

# January 2024 – Present

Jakarta, Indonesia

# PUBLICATIONS

- Y. Gombo, A. Tiwari, M. Safwat, H. Chang and S. Devasia, "Communication-free Decentralized Controller Design for Flexible Object Transport," in IEEE Transactions on Mechatronics 2024, https://doi.org/10.1109/TMECH.2024.3399120.
- [2] Y. Gombo, A. Tiwari, M. Safwat, H. Chang, and S. Devasia, "Delayed Self-Reinforcement to Reduce Deformation During Decentralized Flexible-Object Transport," IEEE Trans. Robot., vol. 40, pp. 999–1018, 2024, doi: 10.1109/TRO.2023.3343997.
- [3] Y. Gombo, A. Tiwari, and S. Devasia, "Accelerated-Gradient-Based Flexible-Object Transport With Decentralized Robot Teams," IEEE Robot. Autom. Lett., vol. 6, no. 1, pp. 151–158, Jan. 2021, doi: 10.1109/LRA.2020.3036569.
- [4] Y. Gombo, A. Tiwari, and S. Devasia, "Communication-free Cohesive Flexible-Object Transport using Decentralized Robot Networks," in 2021 American Control Conference (ACC), New Orleans, LA, USA: IEEE, May 2021, pp. 106–111. doi: 10.23919/ACC50511.2021.9482946.
- [5] A. Tiwari, Y. Gombo and S. Devasia, "Improving network's transition cohesion by approximating strongly damped waves using delayed self reinforcement," 2021 Seventh Indian Control Conference (ICC), Mumbai, India, 2021, pp. 277-282, doi: 10.1109/ICC54714.2021.9703122.
- [6] McCann, L, Lee, C, Gombo, Y, Garbini, J, & Devasia, S. "Data-Based Learning for Control of Elastic Interactions Between Robot and Workpiece." Proceedings of the ASME 2019 Dynamic Systems and Control Conference. Park City, Utah, USA. October 8–11, 2019. V001T10A005. ASME. https://doi.org/10.1115/DSCC2019-9200
- [7] McCann, L., Gombo, Y., Tiwari, A., Garbini, J., and Devasia, S. (October 25, 2023). "Data-Based Stiffness Estimation for Control of Robot–Workpiece Elastic Interactions." ASME. Letters Dyn. Sys. Control. July 2023; 3(3): 031003. <u>https://doi.org/10.1115/1.4063606</u>

# WORKSHOP

 [1] 2023 IEEE/ASME International Conference on Advanced Intelligent Mechatronics Workshop on Dynamic Cohesive Tracking in Networks Thursday, June 29, 2023, 10:00 AM - 12:00 PM, Vashon 2 Organizer: Dr. Anuj Tiwari, Seattle, WA Workshop website: <u>https://sites.google.com/view/anujtiwariuw/workshopstutorials/aim-2023-workshop</u>

# COMMUNITY

## Papua Muda Inspiratif

Co-founder

Jayapura, Indonesia

September 2019 - Present

• Initiated an innovation movement in Papua Province of Indonesia that focuses on bridging young entrepreneurs with resources such as mentorship and incubation.