

# Tsvetan I. Zhivkov

ROBOTICS · MACHINE LEARNING

London, SW19 1PF, United Kingdom

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*"I am a researcher in agricultural robotics, passionate about artificial intelligence and machine learning."*

## Experience

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### Lincoln Agri-Robotics, University of Lincoln

Lincoln, United Kingdom

POSTDOCTORAL RESEARCHER

May 2020 - present

- Developed a new *Agricultural Weeding Robot* platform with *Custom Sensors* and created a *ROS based Physics Simulation* for it.
- Secured a £300,000 grant for a three-year *Tree Singulation Project*.
- Integrated *Custom LiDAR Sensors* for *UAV Crop Mapping* and *Ground Robot Navigation*.
- Performed *UAV flights* for *Mapping* and *Scanning* crops to test *Machine Learning Models*.
- Set up a *Robotics Arena* for teaching and postgraduate research in *Fleet Robotics* and *Agri-Robotics*.
- Maintained and configured a *Private 5G Network*, and designed and configured a *WiFi System* for *Robot Communication*.
- Researched the *Speed-Up* of *5G Agri-Robotics* communication and developed code for the analysis of *Quality-of-Service* metrics and *Data Representation*.
- Liaised in planning and organising of demonstrations and presentations during the *Fresh Produce Consortium* (the biggest agri-event for the University of Lincoln).
- Held guest seminars on "*Multi-Robot System Design and Implementation*" to postgraduate students.

### Engineering Department, King's College London

London, United Kingdom

ROBOTICS ENGINEER

Dec. 2019 - May 2020

- Part-time: Developed custom *Drivers* for specialist robotic hardware; and delivered *Workshops* for *Robotic Applications* of specialised *Multi-Sensor Perception*.

### Faculty of Natural & Mathematical Sciences, Graduate Teaching Scholarship, King's College London

London, United Kingdom

TEACHING ASSISTANT

Oct. 2015 - Apr. 2020

- Lab assistant for: 4<sup>th</sup> year *Data Mining* (Python), *Computer Vision* (MATLAB) and *Computer Programming* for *Data Science* (Python), 2<sup>nd</sup> year *Database Systems* (SQL/SQLite), 1<sup>st</sup> year *Programming Practise & Applications* (JAVA)
- Taught tutorials/seminars for: *Programming Practise & Applications* and *Computer Vision*.
- Marked assignments, coursework and delivered either written or verbal student feedback for: *Programming Practise & Applications*, *Computer Programming* and *Data Mining*.

### Centre for Robotics Research Recruitment & Outreach, King's College London

London, United Kingdom

DEMONSTRATOR/PRESENTER

Jun. 2016 - Present

- Performed robotic demonstrations for industry professionals and potential students.
- Co-organiser of the 2017 open day for Centre for Robotics Research (CoRe) group.

### Summer Internship on Data Capture, University of Liverpool

Liverpool, United Kingdom

APPLICATION DEVELOPER

Jun. 2014 - Sep. 2014

- Researched and Developed methods of *Retrieving Text* and *Image Data* from users who operated mobile devices (iPad).
- Designed a prototype *Application* that enabled users to take *Photographs*, *Annotate* them and leave *Comments*.
- Implemented a method for *Data Storage* that enabled *Multi-Platform Data Retrieval* for further analysis.

## Education

### King's College London

London, United Kingdom

PHD (GRADUATE TEACHING SCHOLAR) IN COMPUTER SCIENCE

Sep. 2015 - Mar. 2020

- **Research Title:** A Multi-Robot Communication Framework for the Analysis and Mitigation of Network Perturbations.
  - Investigated the impact of disrupted *Communication* on *Multi-Robot Teams*.
  - Developed *Algorithms* to *Mitigate Detriments* (failure) indicated by the *Performance Metrics*.
  - Evaluated *Simulated* and *Physical* robot *Empirical Results*, using a large collection of *Performance Metrics*.
- **Research Field(s):** Multi-Robot Systems, Communication-Based Control, Agent Behaviour.

### University of Liverpool

Liverpool, United Kingdom

MENG IN COMPUTER SCIENCE AND ELECTRONIC ENGINEERING

Sep. 2011 - Jul. 2015

- **Fourth Year Group Project:** Robot Object Search and Retrieval Team - Developed an application to improve human-robot interaction.
- **Third Year Project:** Multistage Electromagnetic Projectile Accelerator.

## Publications

### The need for speed: How 5G communication can support AI in the field

Virtual

PRESENTED AT UKRAS21 CONFERENCE: ROBOTICS AT HOME

Jun. 2021

### Modelling variable communication signal strength for experiments with multi-robot teams

Lincoln, United Kingdom

PRESENTED AT UKRAS20 CONFERENCE: ROBOTS INTO THE REAL WORLD

May 2020

### MRCComm: Multi-Robot Communication Testbed

London, United Kingdom

PRESENTED AT THE 20<sup>TH</sup> TOWARDS AUTONOMOUS ROBOTIC SYSTEMS CONFERENCE

Jul. 2019

### Establishing Continuous Communication through Dynamic Team Behaviour Switching

Loughborough, United Kingdom

PRESENTED AT THE 2<sup>ND</sup> UK-RAS19 CONFERENCE ON EMBEDDED INTELLIGENCE: ENABLING & SUPPORTING RAS TECHNOLOGIES

Jan. 2019

### Measuring the Effects of Communication Quality on Multi-Robot Team Performance

Surrey, United Kingdom

PRESENTED AT THE 18<sup>TH</sup> TOWARDS AUTONOMOUS ROBOTIC SYSTEMS CONFERENCE

Jul. 2017

## Skills and interests

### RELEVANT SKILLS

**Programming** Python, C++, Bash (Expert), MATLAB, CMD (Advanced), JAVA, Objective-C (Intermediate).  
**Software** Git, Latex and Microsoft Office.

**Frameworks** Robot Operating System (ROS), Docker, VirtualBox, Scikit-learn, Pandas, Matplotlib, PyTorch.

**Operating Systems** Linux (Ubuntu), Microsoft Windows and Mac OSX.

### HOBBIES AND INTERESTS

**Computer building** Passionate about building computers and keeping up to date with current technology trends and news.

**Fitness** Regularly indulge in fitness activities including weightlifting, bouldering and tennis.

**Board games** Board game lover who frequently meets with friends to play a large variety of games, including DnD.