Paweł Kowalski

Information Scientist,
PhD

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in in/pbkowalski

About Me ─────────

A recent PhD graduate with a systems engineering background and mindset. Recently focused on applying novel Artificial Intelligence methods to Maritime Situational Awareness for countering hybrid threats and decision support. A self-motivated fast learner with history of adding value from Day 1. Used to multinational environments having lived and worked or studied in four different countries. Looking for a more applied research position or branching out into consulting or management.

Highlights ─────────

⚖ Quick learner

🎓 Strong mathematical and scientific capability

⚙ Familiarity with different engineering areas

🔗 Proactive and leadership-oriented

Languages ─────────

🔴 Polish	●●●●●
🇬🇧 English	●●●●●
🇮🇹 Italian	●●●○○
🇩🇪 German	●●○○○
🇪🇸 Spanish	●●○○○
🇫🇷 French	●○○○○

Experience

2020 - present	**Junior Scientist, A1**	NATO STO CMRE, La Spezia, Italy

Independent researcher working on Maritime Situational Awareness for protection of sensitive undersea infrastructure and countering hybrid threats

- From 2022 leading the development of the FORUM research platform for fusion of heterogeneous, uncertain information - including HUMINT, deep learning classifiers, AIS signal analyses - and data visualisation

- Development of algorithms and tools for uncertain reasoning and visualisation in MATLAB and Python. Producing publications, reports and presentations for technical and non-technical audiences.

- Other areas of research: reasoning with belief functions, optimal selection of sources (long evidential sequences, Partially Observable Markov Decision Processes and deep reinforcement learning) and reasoning about multiple entities for threat assessment using evidential networks, conceptual graphs and ontologies.Development of a partially synthetic dataset for verification and validation of the above

- Acting as the point of contact for some NATO activities related to Maritime Situation Awareness; liaising with researchers from both industry and academia in different countries

March - December 2019	**Research Fellow**	NATO STO CMRE, La Spezia, Italy

Secondment during PhD studies. Research on context-awareness in theory of evidence for investigation of behaviour of suspicious vessels. Development of tools for uncertain reasoning and visualization in MATLAB; development of an appropriate GUI in Python. Writing technical reports, research papers and presenting findings at conferences. Supporting organisation of conferences and workshops.

Sep 2016 - Feb 2019	**Teaching Assistant**	University of Bristol, UK

Supporting the delivery of several units, including: Engineering Mathematics, Embedded and Real-Time Systems and Digital Electronics, including both tutoring both one-on-one and larger groups

July 2015 - Sep 2015	**Intern (Software Engineering)**	SOMNIUM Technologies, Chepstow, UK

Developing embedded demos for ARM Cortex M boards to showcase performance, efficiency and size improvements provided by Somnium® DRT toolchain.

July 2013 - Aug 2013	**Engineering Intern**	GKN Aerospace, Bristol, UK

Application of systems thinking to improve the rate of production at the A350XWB wing spar manufacturing facility. Value stream mapping, overall equipment efficiency analysis, lost time analysis and statistical process control.

Aug 2012 - June 2013	**Systems Engineering Intern**	GE Aviation Systems, Cheltenham, UK

Development of a configurable remote interface product. Detailed design, implementation, integration and informal verification and validation. Reviewing and re-working service and test requirements, ensuring that they are clear and unambiguous and that there is no conflict between various requirements document. Interfacing with the other teams to understand any additional constraints. Conducting research into implementation of similar functionality in previous projects. Identification of relevant pre-existing software libraries, design and implementation of the BIT and Housekeeping functionality on the unit. Documentation of the design using IBM DOORS and Dimensions software. Automation of SQL-related tasks for toolchain migration. Peer reviewing designs. Induction of new team members to the project and leading minor tasks (group of 3 people).

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Technical Skills ——

- ▸ Uncertainty modelling
  - ⁘ Belief functions
  - ⁘ Probabilistic modelling
  - ⁘ Fuzzy sets
- ▸ Expert systems
- ▸ Research skills
- ▸ Statistics
- ▸ Machine learning
  - ⁘ Deep learning
  - ⁘ Fusion of classifiers
  - ⁘ Reinforcement learning
- ▸ Systems engineering and Agile

Programming ——

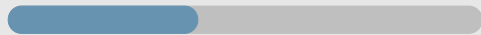Multiple large research projects

Python
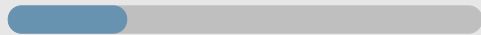
MATLAB

Smaller projects

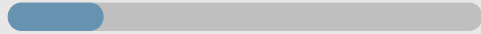Java

Embedded C

Occasional use

SQL

C++

R

Interests ——

- Sports: martial arts (multiple years of Japanese Jiu-Jitsu, competitive Judo experience, recently started Brazilian Jiu-Jitsu), snowboarding, wakeboarding, hiking, weightlifting
- Games: traditional games (cards, chess, modern tabletop, role-playing) and video games
- Cooking, especially fusion cuisine
- Language learning

Education

2015 – 2021	**PhD, Engineering Mathematics**	University of Bristol, UK

Thesis title: Multi-Source Heterogeneous Intelligence Fusion

- EPSRC Centre for Doctoral Training in Communications, co-sponsored by Thales Group.
- Challenges associated with information fusion with multiple sources under uncertainty
- Focus on context-awareness, explainability and and reasoning about relations between multiple entities. Established formal links between semantic graphs, evidential networks and Markov Logic Networks
- Established collaboration with NATO STO Centre for Maritime Research and Experimentation

2010 – 2015	**MEng Engineering Design (First class)**	University of Bristol, UK

Specialization in Mechatronics with a selection of electrical and electronics units. Year 3 dissertation: "Evaluation of the process and tools used to generate the Resource Database for a Remote Data Concentrator". Research project: "Application of health and state monitoring technologies to airship design"

Selected Recent Publications

2022   **Explaining the impact of source behaviour in evidential reasoning**
P Kowalski, M Zocholl, AL Jousselme
Information Fusion

2021   **Toward measuring information value in a multi-intelligence context**
AL Jousselme, T Wickramarathne, P Kowalski
IEEE 24th International Conference on Information Fusion (FUSION)

2021   **Investigating suspicious vessel behaviour in light of context**
P Kowalski, AL Jousselme
IEEE 24th International Conference on Information Fusion (FUSION)

2020   **Explainability in threat assessment with evidential networks and sensitivity spaces**
P Kowalski, M Zocholl, AL Jousselme
IEEE 23rd International Conference on Information Fusion (FUSION)

2019   **Embedding Uncertainty in Conceptual Graphs for Semantic Information Fusion**
P Kowalski, T Martin
IEEE Conference on Cognitive and Computational Aspects of Situation Management (CogSIMA)

Awards

2017   **BFAS scholarship**   Belief Functions and their Application Society
Scholarship to fund fees for the Belief Functions Summer School in Xi'an, China

2015   **EPSRC Scholarship**   EPSRC
Scholarship to fund doctoral studies at University of Bristol

2013   **Top result studentship**   University of Bristol
Studentship for top result in the cohort

Other Activities

Jiu-jitsu   Vice-captain of the University of Bristol Jiu-Jitsu Club in 2014-15, and club treasurer in 2015-16

Polish Society   President of the University of Bristol Polish Society in 2014-2015

October 5, 2022   **Paweł Kowalski**