PERSPEKTYWY WOMEN IN TECH SUMMIT

SEMINAR PROGRAM

WARSAW SEMINAR FOR COMPUTER SCIENCE RESEARCHERS

14 NOVEMBER 2019
WARSAW, POLAND
EXPO XXI

Perspektywy

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WOMEN IN TECH SUMMIT

PERSPEKTYWY WOMEN IN TECH SUMMIT

PROGRAM

14 November 2019 (Thursday)
Venue: Expo XXI, Prądzyńskiego 12, Warsaw

14 NOVEMBER 2019

9.00-9.10 WELCOME

- **Dr. Bianka Siwinska**, CEO, Perspektywy Education Foundation
- **Klaudia Krawiecka**, President, Oxford Women in Computer Science Society

9.10-9.45 MY PATH OF LIFE AND PASSION – PANEL DISCUSSION

Moderator: **Klaudia Krawiecka**

Panelists:

- **Prof. Marta Kwiatkowska**, Professor of Computer Science, Trinity College, University of Oxford (UK)
- **Prof. Margot Gerritsen**, Head of Women in Data Science, Stanford University (US)

9.45-10.00

- **Dr. Harin Sellahewa**, Dean of Computing, Reader in Computer Science, The University of Buckingham (UK): *Increasing Women in Computing at University of Buckingham: Achievements and Lessons Learnt*

10.00-11.30 PRESENTATION OF RESEARCH PROJECTS (5 MINUTE "LIGHTNING TALKS") AND INVITATION FOR COOPERATION

Speakers:

- **Anna Zatwarnicka**, PhD, Opole University of Technology: Impatient on the Web? *How Artificial Intelligence Mechanisms Can Help Users to Accelerate Using of the Web Cloud*
- **Grażyna Suchacka**, PhD, University of Opole: *Web Bot Detection Based on Server Log Data*
- **Selina Cho**, PhD Candidate, University of Oxford: *Going Dark: A Case Study of Banned Darknet Drug Forums*
- **Dota Szymborska**, Phd Candidate, Marie Curie Skłodowska University in Lublin: *Ethics of Algorithms in Autonomous Vehicles – Roots and Possibilities*
- **Daria Wotzka**, PhD, Opole University of Technology: *Numerical Model of Obstacle Lighting Lamp for the Purpose of Heat and Light Propagation Analyses*
- **Anna Gorawska**, PhD, Silesian University of Technology: *Fuel Leak Detection for Saving Environment (and Money)*
- **Agnieszka Ławrynowicz**, PhD, Dr. Habil., Poznan University of Technology: *Extracting Knowledge From Explanations*
- **Kahlaoui Hajer**, MSc, UPEM Paris: *Convolutional Neural Network*
- **Ewa Szczurek**, PhD, University of Warsaw: *Machine Learning in Computational Oncology*
- **Zuzanna Krawczyk**, PhD, Warsaw University of Technology: *Automated Method for Three-Dimensional Individualised Skeletal Models Creation*
- **Żaneta Świderska-Chadaj**, PhD, Warsaw University of Technology: *Deep Learning in Digital Pathology*
- **Estera Kot**, PhD Candidate, Warsaw University of Technology: *Segmentation of Brain Biomedical Images to Compute Glioma Volumes*
- **Wanda Niemyska**, PhD, University of Warsaw: *Knots, Links and Lassos in Proteins*
- **Irina Tuszyńska**, PhD, University of Warsaw: *Bioinformatics in Understanding of Chromatin Structure*
- **Rosalee Wolfe**, PhD, Professor, DePaul University, School of Computing: *Sign Language Avatars: a Noninvasive Technology to Help Bridge the Gap Between the Deaf and Hearing*

11.30-12.00 "BUBBLY" NETWORKING

SPECIAL GUESTS

IN ALPHABETICAL ORDER

MARGOT GERRITSEN

Stanford University

Professor, Co-director and Co-founder of Women in Data Science

Margot Geertrui Gerritsen is a professor of Energy Resources Engineering at Stanford University and a Senior Associate Dean in the Stanford University School of Earth, Energy & Environmental Sciences. She is a computational mathematician, and interested in numerical analysis and simulation of energy and fluid flow processes, including flow and transport in reservoirs, ocean dynamics and sailboat design. She was born in the Netherlands. She earned a master's degree at Delft University of Technology. She completed her doctorate in 1996 in scientific computing and computational mathematics at Stanford, under the supervision of Joseph Oliger. She then worked at the University of Auckland before rejoining Stanford as a faculty member in 2001. She was named a SIAM Fellow in 2018. Margot is co-founder and co-director of the Women in Data Science initiative (WiDS, www.widsconference.org).

MARTA KWIATKOWSKA

Trinity College, University of Oxford

Professor of Computer Science

Marta Kwiatkowska is Professor of Computing Systems and Fellow of Trinity College, University of Oxford. A graduate of the Jagellonian University, she is known for fundamental contributions to the theory and practice of model checking for probabilistic systems, focusing on automated techniques for verification and synthesis from quantitative specifications. She led the development of the PRISM model checker (www.prismmodelchecker.org), the leading software tool in the area and winner of the HVC Award 2016. Probabilistic model checking has been adopted in diverse fields, including distributed computing, wireless networks, security, robotics, healthcare, systems biology, DNA computing and nanotechnology, with genuine flaws found and corrected in real-world protocols. Kwiatkowska is the first female winner of the Royal Society Milner Award and was awarded an honorary doctorate from KTH Royal Institute of Technology in Stockholm. She won two ERC Advanced Grants, VERIWARE and FUN2MODEL, and is a coinvestigator of the EPSRC Programme Grant on Mobile Autonomy. Kwiatkowska is a Fellow of the Royal Society, Fellow of ACM and Member of Academia Europea.

HARIN SELLAHEVA

University of Buckingham

PhD, Dean of Computing, Reader in Computer Science

Dr. Harin Sellahewa holds a BSc in Information Systems and a DPhil in Computing, both from the University of Buckingham. He worked as a Research Associate on the EU-funded FP6 project, SecurePhone. He joined the Gray Cancer Institute as a post-doctoral scientist. He rejoined Buckingham in as a researcher, became a Senior Lecturer in July 2012 and a Reader in January 2018. He was appointed Head of Applied Computing Department (in School of Science) in November 2014, Interim Dean of School of Computing from September 2018 and Dean of Computing from September 2019. Since joining Buckingham, Harin has held the roles of Programme Director, Admissions Tutor, Research Officer and Link Tutor. Harin's research interests are in Artificial Intelligence, Computer Vision, and Machine Learning. He continues to supervise a number of PhD projects in AI, Biometrics, Digital Health, and Cyber Security. He is the module lead for Image Processing, Software Project Management, and Software Engineering.

SPEAKERS

IN ALPHABETICAL ORDER

SELINA CHO

University of Oxford

PhD Candidate, Department of Computer Science

Selina Cho holds an MSc (Distinction) in Information Security and a BA in Economics. Her masters dissertation elaborated on the concept of security through obscurity through its designs in cryptographic obfuscations and image steganography. Prior to joining the CDT, Selina worked as a security consultant in a power plant. She is the President of the Oxford Fintech and Legaltech Society, a platform for sharing interdisciplinary ideas in finance and law through seminars, hackathons, and research collaborations. She helped establish the Society's partnership with Deep Tech Dispute Resolution Lab in the Faculty of Law to investigate automated negotiation methods. She is interested in understanding how cybercrime intersects with online social entertainment. Her current work explores the behavioural and social factors involved in manipulating online game tools, and the interplay between cheaters and non-cheaters within collaborative team play and resource gathering.

ANNA GORAWSKA

Silesian University of Technology

PhD, Faculty of Automatic Control, Electronics and Computer Science

Anna Gorawska is a data scientist, data warehouse and ETL expert. She has received PhD in computer science in 2018 from Silesian University of Technology in Gliwice, where she helds Assistant Professor position. She has been also working as a developer and a team leader in industrial project. Anna is really into data, its warehousing, its science, its mining and algorithms. Her speciality is analysis and modelling of systems for Big Data and data streams' extraction, processing, and storing (IoT). Her biggest passion is working with real data and solving real problems encountered by industry, especially from the so-called heavy industries like fuels, and energy. She created a petroleum leak detection system that was used on more than 50 petrol stations in Poland. She has expirience in patenting, and conducting certification for compliance with American and European standards. In her free time she enjoys craftwork, including pottery, basketry, carpentry, and upholstery.

KAHLAOUI HAJER

UPEM Paris

MSc

Artificial intelligence (AI) is used in our daily lives to do all sort of things that range from entertainment to security. Its use has spread so much over the past decade that we often fail to understand how important a place AI has come to take in our daily lives, which is why it is critical to share information and experiences around this technology. As an IT-student, Hajer Kahlaoui has been given the opportunity to work at CERN Open Lab's Data Center in Geneva, Switzerland and also SyroCon Consulting GmbH in Frankfurt,Germany. She has also been active in associations such as IEEE that supports women in IT-related fields and has a transversal scope of experiences in computer networks management, development and data science. The diversity as well as the complexity of her missions and her positive mindset make her an interesting spokesperson on the matter.

ESTERA KOT

Warsaw University of Technology

PhD Candidate, Faculty of Electrical Engineering

Estera Kot is a PhD Candidate in AI applied to medical images at Warsaw University of Technology. In collaboration with the Department of Nuclear Medicine, Medical University of Warsaw, Estera is currently researching the computer vision's algorithms for image processing to detect, measure, and visualize brain tumors. Aside from her research interest, Estera worked on ML algorithms used for time series forecasting at Intel and security and software development at Sony Electronics. Currently, Estera is responsible for building a cloud big data platform used for cross-data type visualization at Procter&Gamble.

SPEAKERS

ZUZANNA KRAWCZYK

Warsaw University of Technology

PhD, Electrical Engineering Department

Zuzanna Krawczyk is a research and teaching assistant at the Electrical Engineering Department of Warsaw University of Technology in the Division of High Voltage and Electromagnetic Compatibility. She completed her master degree and recently, in 2019, her doctorate in Computer Science at the same academic institution. During her doctoral studies, she spent three months at CERN simulating a new type of waveguide to cavity compact coupler. She also studied for one semester at RWTH University in Germany. Her scientific interests are focused on the application of IT methods in medical treatment, automatic creation of 3D bones models on the basis of CT scans and optimisation of radiotherapy planning, as well as on numerical simulations in electrical engineering, e.g. optimisation of 3D meshes for FEM analysis and numerical simulations of electromagnetic field. She is an open software fan interested in Korean culture, with a passion for hiking, skiing, and good movies.

KLAUDIA KRAWIECKA

Oxford Women in Computer Science Society

President

Klaudia Krawiecka is a doctoral student at the Centre for Doctoral Training in Cyber Security at the University of Oxford and the recipient of (ISC)² Women's Cyber Security Scholarship. She graduated from the NordSecMob programme in 2017, obtaining a Master's degree in Security and Mobile Computing from two universities: Aalto University and Norwegian University of Science and Technology. Her passion for Cyber Security started with an internship in the ICT security office at Polkomtel where she was introduced to Computer Forensics and Cyber Security fields. She also worked as a Research Assistant at Aalto University in Secure Systems Group. Her research project, which developed into her Master's dissertation, resulted in the development of SafeKeeper, an open-source system that secures users' passwords on the web. This project received three prestigious awards. In 2018, she was elected President of Oxford Women in Computer Science Society (OxWoCS) at the University of Oxford.

AGNIESZKA ŁAWRYNOWICZ

Poznan University of Technology

PhD, Dr. Habil., Center for Artificial Intelligence

Agnieszka Ławrynowicz is an Asst. Professor at the Faculty of Computing and Founding Member of Center for Artificial Intelligence and Machine Learning (CAMIL) at Poznan University of Technology. She has lead or participated in several both research and industry funded projects related to data science and machine learning, including EU FP7 project e-LICO aimed to build an intelligent assistant for data mining. She obtained a Marie-Curie fellowship in the topic of Web mining (University of Ulster), was a laureate of the Foundation for Polish Science under the POMOST program. She has been a member of OCs and PCs of major conferences on knowledge engineering, data science and AI (WWW, IJCAI, AAAI, ISWC, ESWC, K-CAP, EKAW, and others), co-chair of W3C Machine Learning Schema Community group, and visitor to several research labs, including BMIR at Stanford University (USA), UPM-OEG (Spain), Jozef Stefan Institute (Slovenia), University of Geneva (Switzerland), and others.

WANDA NIEMYSKA

University of Warsaw

PhD, Faculty of Mathematics, Informatics and Mechanics

Wanda Niemyska has worked for two years at the Institute of Informatics UW and at the Centre of New Technologies UW. After so called "matex" in Staszic LO she studied at the same time math and computer science at University of Warsaw, and finally got her PhD in the field of mathematics at University of Silesia. During her PhD studies in theoretical math at University of Silesia Niemyska has started collaboration with the interdisciplinary group at University of Warsaw that explores geometric and topological structure of proteins. At the moment it is, along with the 3D structure of the DNA, her main field of interest. For as long as she can remember it was hard for her to choose just one topic, but today she has stopped to struggled with it. Along the science Niemyska devotes herself to students, adventures in the mountains and various ways of meeting people.

BIANKA SIWIŃSKA

Perspektywy Education Foundation

CEO, Summit Initiatior and Director

Dr. Bianka Siwinska is a journalist, scientist, initiator of public campaigns, executive director of Perspektywy Education Foundation. Editor-in-chief of educational magazine Perspektywy, correspondent of University World News. Initiator of public campaign „Girls to Technical Schools" and Start-up Academy for female students of technical and exact sciences studies, as well as projects: "Lean in STEM,", "IT for SHE," "Girls Learn!", and „New technologies for girls" scholarships (in cooperation with Intel). She is coordinator of the program "Study in Poland" conducted by the Conference of Polish Academic Rectors and the Educational Foundation "Perspektywy" and expert of World Bank in Tajikistan. She studied at Warsaw University, Humboldt Univeristät in Berlin, and Columbia University in New York City. She conducted research in NIFU STEP in Oslo. Author of books: "Uniwersytet ponad granicami – Internacjonalizacja szkolnictwa wyższego w Polsce i Niemczech" and "Education goes global. Strategie internacjonalizacji szkolnictwa wyższego"; and reports: „Kobiety na politechnikach."

GRAŻYNA SUCHACKA

University of Opole

PhD, Institute of Informatics

Dr. Eng. Grażyna Suchacka received the MSc degrees in Computer Science and in Management from Wroclaw University of Science and Technology (Poland). In 2011 she received the PhD degree in Computer Science with distinction from Wroclaw University of Science and Technology. Now she is an assistant professor in the Institute of Informatics at the University of Opole (Poland). Her research interests include data analysis and modeling, data mining, and Quality of Web Service with special regard to bot detection and electronic commerce support. She has authored and co-authored more than 60 scientific book chapters, journal and conference papers. She is a senior member of IEEE and a member of Polish Society of Computer Simulation.

EWA SZCZUREK

University of Warsaw

PhD, Institute of Informatics

Ewa Szczurek received Master degrees in computer science at the Uppsala University, Sweden and at the University of Warsaw, Poland. She completed her PhD at the Max Planck Institute for Molecular Genetics, and acquired the PhD degree at the Free University, Berlin, Germany. She then followed with a postdoc at the same Institute and a second postdoc at the ETH Zurich, Switzerland. Since 2015 she is an assistant professor at the University of Warsaw, Poland. She is now looking after five PhD students. In her didactic work she strives to drive students' interests towards statistics and machine learning. Her current scientific focus is computational oncology, an area at the border between computer science, statistics, tumor biology and oncology. Among others, she uses algorithms, probabilistic models and deep learning to decipher the evolutionary history of tumors, discover their spatial organization, facilitate the processing and understanding of histopathological images and optimize personalized treatment.

DOTA SZYMBORSKA

Marie Curie-Skłodowska University in Lublin

PhD Candidate, Faculty of Philosophy and Sociology

Dota Szymborska has MA in Philosophy (thesis about Wittgenstein and Russell) and Sociology (thesis about concept of foe), was lecturing at Warsaw University (Gender Studies), finished Graduate School for Social Research and got Diploma at IISL (Basque Country, Spain). She had participated in many summer and winter schools organized by: IWM, The New School, ISODARCO, ESA-ESRIN. She took part as a speaker in many national and international conferences. Now she is PhD Candidate at UMCS (Lublin, Poland). Her thesis deals with ethical issues of decision-making process in AV's. She is triathlete, marathon runner and after-hours food writer and blogger (oneginetatopa.blogspot.com).

ŻANETA ŚWIDERSKA-CHADAJ

Warsaw University of Technology

PhD, Department of Electrical Engineering

Żaneta Świderska-Chadaj is a postdoctoral researcher at the Diagnostic Image Analysis Group and the Digital Pathology Group of Radboud University Medical Center in Nijmegen, the Netherlands. She received her Master's degree in Biomedical Engineering at Warsaw University of Technology, Poland in February 2014. In October 2017 she obtained her Ph.D. at Faculty of Electrical Engineering of Warsaw University of Technology, Poland. She works on an application of artificial intelligence and method such as deep learning to support a medical diagnosis. Her research field is image analysis and automatic cancer detection.

IRINA TUSZYŃSKA

University of Warsaw

PhD, Faculty of Mathematics, Informatics and Mechanics

Irina Tuszynska is an assistant professor in a group of Regulatory Genomics at the University of Warsaw. She works in the field of Bioinformatics, and interested in understanding of chromatin structure using computer simulation methods like Monte Carlo or Molecular Dynamics as well as statistical methods to analyzing contact maps obtained by Hi-C experiment. Irina was born in Belarus. She obtained a master's degree at Wroclaw University of Technology in Poland. Next she worked at International Institute of Molecular and Cell Biology in Warsaw. She completed her doctorate in 2013 in structural bioinformatics at Institute of Biochemistry and Biophysics of Polish Academy of Science. In 2015 she joined Bartosz Wilczynski laboratory at the University of Warsaw.

SPEAKERS

ROSALEE WOLFE

DePaul University, School of Computing

PhD, Professor

Rosalee Wolfe is a Professor in the School of Computing at DePaul University in Chicago. After earning a Ph.D. in Computer Science from Indiana University, she was a NASA fellow at the Johnson Space Center, served on various committees of ACM SIGCSE and SIGGRAPH, is a Sony IPAX fellow, and has been selected as a Fulbright scholar for 2020. In 1998, she co-founded the American Sign Language Avatar Project at DePaul University after meeting a Deaf student. The goal of this project is developing an avatar for realistic, real-time portrayal of signed languages. Since then she has supervised both Deaf and hearing students, including the first Deaf woman to earn a PhD in Computer Science. She is always delighted to meet members of the vibrant community of women who have recently chosen Computer Science / Information Technology as their profession.

DARIA WOTZKA

Opole University of Technology

PhD, Faculty of Electrical Engineering, Automatic Control and Informatics

Daria Wotzka graduated from computer science in 2008 at the University of Technology in Berlin, and received her PhD in technical sciences in the field of electrical engineering in 2011 at the Opole University of Technology, where she currently works as an university lecturer. Her research interests include, among others, numerical and experimental analysis of acoustic phenomena generated during operation of power equipment, e.g. transformers or wind turbines; she specializes mainly in digital signal processing with the use of modern computational tools and numerical modelling. However, she is most satisfied with development of expert systems supporting classification, prediction and clustering processes with the use of artificial intelligence methods.

ANNA ZATWARNICKA

Informatics Institute, Opole University of Technology

PhD, Assistant Professor

Anna graduated Computer Science at the Wrocław University of Technology and Science and started working at the Opole University of Technology as research and didactic employee. She defended with honors her doctoral thesis "Method and adaptive algorithms of global distribution of HTTP requests" at the Wrocław University of Technology and Science in 2007 under the supervision of professor Leszek Borzemski. In her scientific work, she deals with the use of artificial intelligence tools to improve the operation of websites and the cloud. Anna provide lectures in programming languages and software engineering. She is the tutor of the student scientific group .NET PO Group. Anna cooperates with students and representatives of IT companies. In addition, she has been an entrepreneur for over 10 years. Software produced in her company has been helping thousands of users.

ABSTRACTS

(AUTHORS IN ALPHABETICAL ORDER)

SELINA CHO
PhD Candidate, **University of Oxford**

GOING DARK: A CASE STUDY OF BANNED DARKNET DRUG FORUMS

In March 2018, some of the largest Reddit forums related to darknet markets were banned overnight to the surprise of many users. For the existing users, whose trading activity relies heavily on information sharing, this ban is a threat to the community as a whole as it exists largely only on the virtual interface. This presentation highlights popular discussion topics and mass sentiment of the community that has surfaced as a result in newly founded forums, and assesses the broader implications of disruptions within the drug related darknet community.

ANNA GORAWSKA
PhD, **Silesian University of Technology**

FUEL LEAK DETECTION FOR SAVING ENVIRONMENT (AND MONEY)

Leak and spills of petroleum endanger the environment, while remediation costs and penalties imposed when petroleum contaminates the ecosystem affect economics heavily. I will briefly present a fuel leak detection system I have created for the company from liquefied petroleum sector. The system allowed to detect leaks with over 93% probability and was deployed at 50 petrol stations in Poland. Based on the example of this system, I have focused on how the application of expert knowledge concerning the nature of anomalies and the analysis of historical data affects the effectiveness of their detection. Therefore, I'm proposing that in the process of designing data warehouse systems, the detection of anomalies should be one of the main motivations and determinants of data extraction and storage methods.

KAHLAOUI HAJER
MSc, **UPEM Paris**

CONVOLUTIONAL NEURAL NETWORK

Machine Learning is an expression that refers to the the automation of the action of learning for a "machine". Such a complex process can be achieved through different means, although this publication focuses on Convolutional Neural Networks (CNN), which are commonly used for image analysis. To achieve thorough image analysis, CNNs are often conceived to use black-box approach. This allows the algortihm to extend its sensitivity to barely noticeable details, which allows the algorithm to provide operational answers to complex requests. Applications of Recurrent Neural Networks in Text Analysis, Convolutional Neural Networks in Image Analysis has lead to many successful applications of Deep Learning. However, while being successful and deployed frequently, Deep Neural Networks still have unanswered questions about them. The biggest question surrounding DNN is their interpretability. DNNs are intrinsically "Black-box models", meaning the process that links a given input to output is not explicitly available.

ESTERA KOT
PhD Candidate, **Warsaw University of Technology**

SEGMENTATION OF BRAIN BIOMEDICAL IMAGES TO COMPUTE GLIOMA VOLUMES

Gliomas account for 70% of all primary brain tumors, are determined by the 4th (highest) histologic problem of WHO. The average lifetime after the diagnosis is 12-15 months. Only 5% of patients live up to 3 years after the determination of the disease. In the Nuclear Medicine Institute of the Medical University of Warsaw operating at the Independent Public Central Clinical Hospital in Warsaw, clinical trials are conducted on the method of treatment of multiform gliomas. Its effectiveness is related to several factors, including analyzing software and determining the location, size, and volume of the tumor that determines the method of treatment.The presentation is about the approach and algorithm of segmentation of brain imaging examination results – computed tomography (CT) and positron emission tomography (PET) – to identify, compute, and visualize the brain tumors.

ZUZANNA KRAWCZYK
PhD, **Warsaw University of Technology**

AUTOMATED METHOD FOR THREE-DIMENSIONAL INDVIDUALISED SKELETAL MODELS CREATION

My recent research is focused on automated procedure for individualised skeletal model creation and identification of particular bone structures from computer tomography images. The method is employing an external database of reference skeletal model. The developed procedure relies on the neural network detection in CT images of the bounding boxes for particular bone structures and on matching the reference model elements to them by means of affine transformation and later, by morphing algorithm. The method also incorporates various image processing algorithms including swarm intelligence heuristic algorithm - Artificial Ant Colony (enriched with an original pheromone deposition function). 3D virtual bones models created by the procedure can be used in the task of automatic delineation of bone structures, positioning of the patient for radiotherapy or in planning of orthopaedic medical procedure. They can also serve as a visual help in diseases detection or for educational purposes.

AGNIESZKA ŁAWRYNOWICZ
PhD, Dr. Habil., **Poznan University of Technology**

EXTRACTING KNOWLEDGE FROM EXPLANATIONS

Knowledge graphs are now routinely used for search, question answering, intelligent dashboards etc. in numerous knowledge-intensive applications. Since they are costly to build manually, knowledge extraction techniques are used to produce knowledge graphs, which are prone to various problems: incompleteness, inconsistency, ambiguity and others. The research project I describe aims to study how to develop better knowledge graphs by extracting knowledge from natural language explanations provided in addition to a decision or a recommendation, in particular: Can explanations help in faster automatic creation of knowledge from data? Does the extracted knowledge contain fewer errors if explanations are used in training datasets? How to represent explanations for better provenance tracking and knowledge verifiability? The ultimate objective is to provide more explainable, generalizable and robust data and knowledge-intensive systems.

WANDA NIEMYSKA
PhD, **University of Warsaw**

KNOTS, LINKS AND LASSOS IN PROTEINS

From our early childhood we are interested in the knots while we learn how to tie our shoes, and later how to bind the rope while climbing or sailing, or admiring ancient mosaics. However, you should be interested in the knots for at least one more reason – recent studies showed that around 1% of proteins were knotted. Among them is the enzyme UCH-L which is the most frequently occurring protein in your brain. There is a hypothesis that if UCH-L folds incorrectly, not forming the knot, it may cause neurodegenerative diseases, like Alzheimer or Parkinson disease. The other protein, leptin, forms a lasso while it is folding. If leptin would make a mistake and lasso would not be formed, it may cause an obesity. It is really hard to recognize if the protein is knotted by a naked eye. I'm part of a project whose goal is to create tools that automatically make it for us. The tools are freely available for everybody and hopefully that would help to speed up studies on knotted proteins.

GRAŻYNA SUCHACKA
PhD, **University of Opole**

WEB BOT DETECTION BASED ON SERVER LOG DATA

Web traffic is increasingly dominated by Internet robots (Web bots). Although many of them are useful, like search engine crawlers, many others may be malicious and pose a threat to website security, privacy, and performance. This has motivated a lot of research into differentiation of Web visits (sessions) accomplished by bots and human users – both in the offline settings (when the whole session description in known) and in real time (on the fly). Especially promising results have been achieved by the analysis of historical Web traffic data recorded in server logs and application of machine learning methods to develop new approaches to Web session classification and prediction. The presentation will discuss some recent results achieved in this area.

EWA SZCZUREK
PhD, **University of Warsaw**

MACHINE LEARNING IN COMPUTATIONAL ONCOLOGY

Cancer is a disease of the genome, and results from an evolutionary process and selection of advantageous mutations. Recent years brought immense development in experimental methods registering changes in cancer cells and their tissue microenvironment. Ever more efficient therapies are being discovered. Cancer research thus seems to be the discipline of molecular biology and medicine. Computer science, however, is an indispensable factor to contemporary progress both in tumor biology and oncology. I will describe our machine learning methods that facilitate reasoning from high dimensional molecular cancer data, enable digital histopathological image analysis and foster personalized cancer medicine by optimizing drug treatment given specific mutational profile in the cancer genome.

DOTA SZYMBORSKA
PhD Candidate, **Maria Curie Skłodowska University in Lublin**

ETHICS OF ALGORITHMS IN AUTONOMOUS VEHICLES – ROOTS AND POSSIBILITIES

I present main questions that should be raised regarding to AV's and their future in our roads. The development of science will show whether we humans will develop respect for machines or remain in the manager-tool relationship. The algorithm will decide by making calculations based on data, its training set. Programming autonomous systems is like raising children, if we are an authority and we set a good example, we can trust that in a critical situation it will be possible to refer to the past, to our system of shared values. The use of such a comparison allows for a deeper reflection on the nature of algorithms and treating them differently than merely zero-one formulas.

ŻANETA ŚWIDERSKA-CHADAJ
PhD, **Warsaw University of Technology**

DEEP LEARNING IN DIGITAL PATHOLOGY

In recent years, deep learning has brought a revolution to the field of pattern analysis and machine learning, by providing algorithms with the capacity to learn complex representations from the raw data itself, achieving human and even super-human level performance in some fields, including medical image analysis. The rise of digital pathology has fostered the development of computer algorithms based on machine learning for the analysis of histopathology whole-slide images (WSI). DL methods can be applied to various tasks, such as cancer detection or classification, and cell and biological structure detection and segmentation. These methods have the potential to make the transition from subjective visual estimation to reproducible accurate object (e.g. cell) quantification via automatic detection. It opens a new room to support digital pathology.

IRINA TUSZYŃSKA
PhD, **University of Warsaw**

BIOINFORMATICS IN UNDERSTANDING OF CHROMATIN STRUCTURE

The nucleus of every living cell contains DNA that encodes all of the genes in an organism. Genomic DNA in the nucleus exists in the form of chromatin, which is a complex of DNA with proteins and RNA. Human cell contains around two meters of DNA, folded into the cell's nucleus that is a tenth of the thickness of a human hair (10 micrometers) in diameter. This suggests that the chromatin folds into a complex three-dimensional structure in the cell nucleus. Chromosome conformation capture techniques (like 3C, Hi-C and other) are used to analyse the spatial organization of chromatin in a cell. However, experimental methods do not allow to directly visualise the structure of chromatin, they show only the average frequency of contacts of individual regions of chromatin. Theoretical methods are extremely useful and effective tool to support experimental research. I will describe my projects, where I develop theoretical methods that help to understand the chromatin folding process using Monte Carlo simulation and to find statistically significant chromatin interactions in Hi-C maps using statistical analysis.

ROSALEE WOLFE
PhD, Professor, **DePaul University, School of Computing**

SIGN LANGUAGE AVATARS: A NONINVASIVE TECHNOLOGY TO HELP BRIDGE THE GAP BETWEEN THE DEAF AND HEARING WORLDS

Imagine a world where everyone used a language you didn't understand. This would make simple things like grabbing a burger or dropping off a package a time-consuming process. In serious situations, the communication barrier could become highly stressful or even life-threatening. This is what Deaf people experience every day. This is not just a barrier of sound – it's a barrier of language. Their first language is a signed language. Signed languages are different in grammar and vocabulary from spoken languages. For Deaf communities, written languages are always second languages. To bridge the communication gap, our multidisciplinary group at DePaul University in Chicago is working on sign language avatars. Our avatar, "Paula", produces 3D animations of American Sign Language (ASL). We are in process of expanding Paula's ability to "speak" other signed languages of the world.

DARIA WOTZKA
PhD, **Opole University of Technology**

NUMERICAL MODEL OF OBSTACLE LIGHTING LAMP FOR THE PURPOSE OF HEAT AND LIGHT PROPAGATION ANALYSES

The subject matter of my research works concerns the use of modern tools and computational methods in various areas of technical science. In this presentation I will talks about my current project, which is carried out in cooperation with industry, and which concerns the development of a computer model of obstacle lighting. She presents numerical model of the lamp including light and heat emission as well as examples of experimental measurements.

ANNA ZATWARNICKA
PhD, Informatics Institute, **Opole University of Technology**

IMPATIENT ON THE WEB? HOW ARTIFICIAL INTELLIGENCE MECHANISMS CAN HELP USERS TO ACCELERATE USING OF THE WEB CLOUD

We live in an IT revolution that takes place day by day in our daily lives. Our habits are changing, more and more of our everyday life is realized through WWW services. As human individuals, we do not like waiting, we are impatient on the web. We are downloading more data and almost flood servers with requests for website content. To support processing on web servers, our team is working on special web request distribution methods. We use algorithms that distribute requests from users among the web infrastructure. Why do we use fuzzy logic in our methods? Because the phrase "little", "a lot", "fast" and "slow" change their meaning depending on the Internet circumstances. Why neural networks? Because only adaptive mechanisms can cope with the specifics of Internet traffic: explosiveness and self-similarity.

PERSPEKTYWY WOMEN IN TECH SUMMIT

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Oxford Women in Computer Science Society

POLSKIE TOWARZYSTWO KOBIET W MATEMATYCE

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