# Summer Internships 2018  
**PHD/MSC Students**

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Company: Palantir

Position (title of the project): Forward Deployed Software Engineer

Job Description: Forward Deployed Software Engineers (FDSEs) understand our customers’ greatest pain points and design end-to-end solutions to address them. FDSEs solicit constant feedback on their work from both customers and colleagues, improving our products over time with rapid iteration cycles.

FDSEs deploy groundbreaking technical solutions to solve our customers’ hardest problems. Projects often start with a nebulous question like “Why are we losing customers?” or “How can we more effectively identify instances of money laundering?” FDSEs lead the way in developing a solution, from high-level system design and prototyping to application development and data integration. As an FDSE, you leverage everything around you: Palantir products, open source technologies[palantir.github.io], and anything you and your team can build to drive real impact.

You work with customers around the globe, where you gain rare insight into the world’s most important industries and institutions. We help our customers detect insider trading, improve disaster relief, fight healthcare fraud, and more. Each mission presents different challenges, from the regulatory environment to the nature of the data to the user population. You will work to accommodate all aspects of an environment to drive real technical outcomes for our customers.

Technologies We Use

- Core Palantir products provide the foundations for our deployments.
- Custom applications built on top of core Palantir platforms.
- Postgres, Cassandra, Hadoop, and Spark for distributed data storage and parallel computing.
- Java and Groovy for our back-end applications and data integration tools.
- Typescript, React, Leaflet, and d3 for our web technologies.
- Python for data processing and analysis.
- Palantir cloud infrastructure based on AWS EC2 and S3.

Requirements:

- Strong engineering background, preferred in fields such as Computer Science, Mathematics, Software Engineering, Physics.
- Familiarity with data structures, storage systems, cloud infrastructure, front-end frameworks, and other technical tools.
- Understanding of how technical decisions impact the user of what you’re building.
- Proficiency with programming languages such as Java, C++, Python, JavaScript, or similar languages.
- Ability to work effectively in teams of technical and non-technical individuals.
- Skill and comfort working in a rapidly changing environment with dynamic objectives and iteration with users.
- Demonstrated ability to continuously learn, work independently, and make decisions with minimal supervision.
- Willingness and interest to travel as needed.
- Technical work experience

Masters Students who are the year before their final year, willing to accept an offer for when they graduate

Contact Details:

Israel@palantir.com [only English CV’s will be processed. Please only apply if you have technical experience in a professional setting *student job or internship*.}
Company: Intel

Position (title of the project): AI Innovation- summer internship

Job Description: Advanced Analytics is a cutting edge group that globally leads Intel's machine learning solutions is seeking an outstanding student in the fields of machine learning/deep-learning for a summer internship. As a part of our diverse and dynamic group, you will use the latest cutting-edge methods in data science across various domains, data types and learning tasks. You will be part of a team developing innovative and high-impact AI solutions.

Requirements:

- MSc/PhD students
- Exceptional MSc/PhD student focusing on machine learning/deep-learning advantage for PhD students
- Strong knowledge and significant experience in data science machine learning/deep-learning.
- Substantial experience in programming, including Python/R/Matlab.
- Highly motivated, methodical, innovation-oriented, communicative and a self-starter

Contact Details: http://career.intel.com/jlKK8
Microsoft

Data Science Summer Internship at Microsoft - Windows Cyber Defense

Company: Microsoft

Position (title of the project): Data Science Summer Internship at Microsoft - Windows Cyber Defense

Job Description:

ENDLESS DATA - Peta-bytes of real-world security data from thousands of end-points to analyze.

REAL-WORLD DATA SCIENCE - Join forces with our applied researches for a 3 months data science project.

YOUR OWN “BUDDY” - Work side by side with a Microsoft’s engineer, which will mentor and guide you through the summer.

GET A FEEL FOR HOW IT’S LIKE
Apply your skills and show your knowledge in a fully productized environment, getting a feel for how it’s like to develop for the world.

Are you interested in radically improving the security of Microsoft’s products?
Do you want to work on the Intelligent Security Graph and new security products?
Windows Defender Advanced Threat Protection (WDATP) is an exciting new product that helps enterprise organizations detect, investigate, and respond to advanced and targeted attacks on their networks.
We are searching for strong self-driven students in their Ph.D. or second year of MA, experienced with Data Science, for a unique and exclusive summer internship with us on the WDATP Research Team.
Our team has a deep understanding of the techniques attackers use to infiltrate enterprise networks and powers the detections behind the WDATP product.
Our research lab innovates in new approaches for detecting these techniques and works with Windows teams to source the needed signals.
If you are a passionate and technically strong data scientist and want to spend this summer doing something unique – apply today for our summer internship.

Requirements:

2nd year in MSc (or at any stage of a Ph.D), in the field of Data Science or Machine Learning

Apply for this position:

https://microsoft.recsolu.com/external/requisitions/NgstE8PMKogCiPbWXGg45Q
Scalable Middleware for Hyperledger blockchain dissemination

General Background: The Cloud and Distributed Middleware group at IBM Research Haifa works at the cutting edge of applied distributed systems research. We bring distributed systems expertise to IBM’s cloud computing assets and develop novel approaches to tackle real-world problems.

Project Description: Blockchain is emerging technology at the heart of crypto currency exchange world, it is powerful and decentralized technology that is revolutionizing the way applications could establish trust, accountability and transparency. Blockchain facilitates security by its design and serves as an example of distributed system with high byzantine fault tolerance. This makes blockchains suitable for the recording of events, title, health care information, identity management, financial transactions and proving provenance.

Our group actively contributing to Hyperledger Fabric project, providing an efficient data dissemination and synchronization middleware allowing scalable communication between all various nodes in the hyperledger network, taking into consideration a Byzantine environment. The data dissemination mechanism proposed is mostly for ledger management with the goal of having all ledger holders to have identical copies of the entire ledger. Our direction is design novel gossip based peer to peer byzantine tolerant communication.

We offer an opportunity to work on cutting edge technical problems (with special focus on byzantine tolerance domain), explore research which promise to have significant impact and may lead to a peer-reviewed publication in a top-tier conferences and contribute to open source community.

PhD candidate from CS (or strong MSc student in advanced stages of her studies).

Knowledge and preferably research experience in distributed algorithms and systems, crypto currency or security. Experience with software development in a Linux environment desirable (Java, Go). Basic knowledge of cloud computing concepts (microservices, distributed datastructures, coordination, load balancers, container aka docker) are a plus.

Full/part time position: Summer internship.

Contact Details: Michalsh@il.ibm.com
Conversational information retrieval is a new emerging field of cognitive IR where users interact with the search system through a natural language dialog.

During the project, we shall develop novel conversational IR techniques that will allow to capture diverse user intents and tasks, model user’s cognitive IR states and respond to user interactions (e.g., clicks, query formulations, dwell-times, etc.).

We shall further explore various communication act strategies for a cognitive IR agent for optimal interaction with human users during IR-driven dialogs.

An outcome of such project should be a research paper targeted to one of the top-tier IR/AI conferences (e.g., SIGIR, CIKM, WWW, AAAI, IJCAI, et.).

**Required skills:**
- PhD or Master level student in CS, EE or IS.
- Good programming skills (Java preferred).
- Basic knowledge in Information Retrieval (with preference to prior knowledge in advanced retrieval models or recommender systems).
- Prior knowledge with state-of-the-art IR, ML or AI tools is a plus.

**Full/part time position:** Summer internship.

**Contact Details:** Michalsh@il.ibm.com

Very recently a plethora of works has been published in the topic of improving recommender systems using user generated textual reviews. The intuition is the unstructured data accompanying the usage history of the users may assist in understanding the users’ preferences and the items’ traits. Thus, we want to employ deep learning techniques to cope with this challenging task.
Job description: During the internship, you will participate in designing and building a deep learning model for the task of recommender system using textual reviews. The research involves NLP capabilities to understand the feedback users expressed in item reviews, along with collaborative filtering to analyze usage patterns. The desired outcome of this internship is a paper submitted to one of the top tier conferences in the field.

Required skills:
Must:

- MSc or PhD student in Computer Sciences/Engineering.
- Proven knowledge and hands-on experience in deep learning.
- Strong analytical skills and creative thinking.

Advantages:

- Experience with TensorFlow.
- Background in Recommender Systems and NLP

Full/part time position: Summer internship.

Contact Details: Michalsh@il.ibm.com

IBM

Learning to synthesize realistic (big) data for training Deep Learning algorithms

Our Cognitive Vision and Augmented Reality (CVAR) team conducts CV and AR research for industrial applications, such as field technician support, specializing in Machine Vision, Deep Learning, and 3D Vision fields. The current methods of choice for solving Object Detection, Recognition and Analysis problems in images and videos are based on deep Convolutional Neural Networks (CNNs), which in turn require massive amounts of real annotated examples to train effectively. Although other methods exist that allow somewhat reducing the training costs of CNNs, in this work we would like to take the data synthesis approach – learn a generative model for the visual data of interest and use it to train CNNs that would be competitive in performance to ones trained using massive amounts of real data. Developing an effective method such as described will allow us not only to overcome the annotated data requirement limitation, but also to improve performance of the various existing data
augmentation techniques increasing accuracy in cases when sufficient training data is available.

**Required skills:**

- Strong analytical skills
- Independent, self-learner
- Background in Computer Vision and Deep Learning
  - (proven record in DL – advantage)
- Programming experience in Matlab
  - (programming experience in C++ – advantage)
- Familiarity with at least one of the common DL platforms: Caffe / Tensorflow / Torch / Matconvnet
  - (familiarity with Caffe – advantage)

**Full/part time position:** Summer internship.

**Contact Details:** Michalsh@il.ibm.com

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IBM

*Incorporating External Knowledge Bases for Solving Diverse NLP Tasks under the Deep Learning*

Understanding a natural language sentence often requires access to various external knowledge since the text itself contains limited information. When people read a sentence, they use knowledge they acquired during their life or access external resources on the spot in case they lack it to better understand the text.

Neural networks that are trained to analyze natural language sentences usually get labeled data for a given predefined task. Labeled data are usually limited in size and consist of limited domain knowledge related information. Current state-of-the-art neural network models have limited ability to access external knowledge in order to obtain the missing information. In this project, we are bridging this gap by solving two main challenges. The first challenge is to embed a knowledge base into the neural network so that the knowledge base representation will be smoothly integrated by the learning algorithm in any neural network architectures.

The second challenge is to define an interface between an existing knowledge base and neural network architecture. In this challenge, we address interesting questions such as:
How does a neural network use the knowledge? What are the forms of access to the knowledge base? What’s the input? What’s the output? How can the output be used?

We are looking for a computer science or engineering PhD/MSc student

**Required Skills:** Background in machine learning, NLP and deep learning; Good programming skills (Matlab / Python/ Java); Good research and self-learning skills

**Full/part time position:** Summer internship.

**Contact Details:** Michalsh@il.ibm.com

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**IBM**

**Failure Analytics for Highly Available Cloud Services**

The Cloud and Distributed Middleware group at IBM Research Haifa works at the cutting edge of applied distributed systems research. We bring distributed systems expertise to IBM’s cloud computing assets and develop novel approaches to tackle real-world problems.

**Project Description:** Our goal is to facilitate the management of large numbers of mission-critical services that are depended upon by customer-facing services on the cloud. In particular, we investigate novel techniques to improve the availability characteristics of such systems through automation and data-driven engineering exploiting the large volume of data we can measure about their operation. This project is at the intersection of machine learning applied to challenges that arise in the management of modern distributed systems. We perform applied / hands-on research by turning our ideas into code / systems and evaluating them in the context of real-world production cloud services.

**We offer:** We offer an opportunity to work on technical problems as they occur in real-world, large-scale cloud computing systems, solutions to which promise to have significant impact and may lead to a peer-reviewed publication in a top-tier conference.

**Required skills:**

- PhD candidate from CS (or strong MSc student in advanced stages of her studies).
- Knowledge and preferably research experience in either machine learning and/or distributed systems.
- Experience with software development in a Linux environment desirable (Java, BASH, python). Basic knowledge of cloud computing concepts (microservices, service discovery, distributed coordination, load balancers, block storage services, and so on) are a plus.
Full/part time position: Summer internship.

Contact Details: Michalsh@il.ibm.com

IBM

Researcher in the Video and GIS Analytics group

The Video and GIS Analytics group – part of the Multimedia Analytics department at IBM Research – specializes in advanced video technologies. This unique group focuses on novel approaches for information overload and technologies in the areas of video analytics and computer vision, real-time rich-content streaming and management, video communication frameworks and geo-spatial situational awareness.

The group develops a scalable framework for real-time connectivity, as well as a platform for off-line rich-media tagging search & retrieval of archived rich media assets.

In the area of video analytics, our group conducts research and develops novel computer vision algorithms (also using machine learning tools) for various problems such:

- Scene text detection and recognition in natural videos and images
- Video scene detection
- Visual recognition, Anomaly detection and Scene understanding.

The goal of the project is to develop and implement novel algorithms for solving various computer vision problems related to video (such as the ones mentioned above), with a special emphasis on robustness and efficiency.

We Offer: An opportunity to work and conduct high-quality research with a leading research group in the area of video analytics and computer vision, on a topic that is on the cutting edge of research and technology.

Required Skills: Graduate student with good research and self-learning skills, as well as with background in image and video processing, and preferably also in computer vision and machine learning. Good programming skills in MATLAB and C++ are required (prior acquaintance with OpenCV is a plus).

Full/part time position: Summer internship.

Contact Details: Michalsh@il.ibm.com
IBM

Machine Learning Research

In our team we develop state-of-the-art technology for chatbots and chatbot construction. When constructing a chatbot, some preliminary data collection is usually required. Once experience with real users is gained, a new source of information emerges – existing conversations.

**Project Description:** We offer two research projects in machine learning (including deep learning) and text analytics. In this project we would like to develop a systematic method and algorithms for collecting new user utterances from existing conversations. More specifically, from those situations in a conversation where the user is misunderstood and has to rephrase her words. In such cases, new utterances can be identified and added to the system so as to improve its understanding. The main challenge, however, is ensuring that we do not pollute the system with inaccurate and erroneous utterances, which may quickly deteriorate the chatbot’s accuracy.

As part of the project, the intern is expected to conduct a literature survey, devise a comprehensive solution for the task at hand, develop and implement the relevant algorithms (text analytics, machine learning), implement a testing framework, and conduct experiments.

**We offer:** We offer two exploratory research projects possibly leading to scientific publications, in addition to participating in developing novel solutions with a clear productization roadmap.

**Skills:**
- Strong analytical skills
- Independent, self-learner
- Background in computer science / related disciplines
- Proficiency and hands-on experience in machine learning or text analytics
- Knowledge in deep learning and experience in TensorFlow is an advantage

**Full/part time position:** Summer internship.

**Contact Details:** Michalsh@il.ibm.com

IBM

Deep Learning NL-LSTM – Next Generation RNN for Semantic NLP tasks

LSTMs became the state-of-the-art deep-learning machinery for processing variable-length sequence data in various machine learning tasks. Dozens of architectures utilizing LSTM were used for different NLP tasks with moderate to good success rates. Two prominent examples are Neural Machine Translation [1], which showed improvement over all previous
methods that included language knowledge, and natural language generation in image captioning [2,3] and dialogs [4] that produced the highest quality of generated text available.

The core LSTM cell was introduced on 1997 for general sequence processing and variants of LSTM such as GRU were introduced later on. However, these variants still address general sequences ignoring the special nature of natural language sequences, with the exception of [5] we are aware of.

In a recent collaboration of members from our group, BIU and MIT [6] we showed that indeed LSTM representation shows a good sequence modeling ability, but at the same time it hardly captures the language related aspects of the sequence. The aim of this internship is to develop and test a new variant for LSTM for NL processing and generation that is considering the special nature of natural language sequences.

A large ecosystem of algorithms was built around LSTMs, including memory networks, attention mechanisms, stacking and more. With the right design, all these algorithms will be applicable to the new NL-LSTM we will build.

**Job description:** During the internship, you will participate in design and lead the development of the NL-LSTM using the best deep learning platforms available with our team of deep learning experts. You will test the new variant on various NLP tasks and datasets, including proprietary datasets IBM possesses for advanced semantic NLP tasks. You will utilize IBM Research cluster of hundreds of GPUs available for our use to train and test new models. We plan for a highly influencing paper based on this work, submitted around 6 months following the internship period to one of the top machine learning or NLP conferences.

**Required skills:**

- MSc or PhD student in Computer Sciences/Engineering
- Proven work in the field of deep learning, advantage for natural language related work
- Superb programming skills, with experience in TensorFlow, TORCH, and/or Theano, with advantage to TensorFlow
- Self-discipline and the ability to work independently
Do you want to influence how computers interact with people using artificial intelligence? Are you interested in developing new ways of teaching computers to reason and argue using Watson technologies?

Our team is creating technologies that will help humans reason, make decisions, or persuade others. These abilities have always been considered exclusive to humans -- until now!

**Project description:** While Watson demonstrated impressive text analytics, it is still confined to answer factual questions where typically there is a right or wrong answer. However, most of the questions that we ask in life are more complex and are influenced by biases and different points of view. For example: "Should we ban smoking?", "Should I rent an apartment or buy one?", "Should IBM make a partnership with Apple?". IBM Debating Technologies is a project which aims to address such scenarios. At a very high level, we are developing a system and a set of tools, which will assist humans in situations where debate and reasoning is required. The system, given a topic under consideration, generates arguments which either support or contest the topic. A demonstration of initial capabilities can be seen here (starting around minute 45):
We offer:

An opportunity to be part of an interdisciplinary, global team, working on a cutting edge technology which is highly exploratory.

Skills:

- Proven background in natural language processing and/or machine learning
- Strong hands-on programming experience; Java is an advantage.

Full/part time position: Summer internship.

Contact Details: Michalsh@il.ibm.com

IBM

Audiovisual Biometric Authentication

We would like to explore innovative approaches to improve the robustness and accuracy of our speaker and face recognition biometric engines and detection of spoofing attacks (user liveness detection). We propose to explore synchronous analysis of voice and the video (audiovisual) live input in order to improve accuracy, robustness and liveness detection.

We offer the opportunity to work on an exploratory research project possibly leading to a scientific publication in addition to contributing to the development of a novel mobile authentication solution.

Required skills:

- PhD candidate from EE or CS
- Knowledge and Research Experience in machine learning and either computer vision,
- speech/signal processing
- Background in deep learning is an advantage
- Background in biometric identification or authentication is an advantage

Full/part time position: Summer internship.

Contact Details: Michalsh@il.ibm.com
**Advanced topic modelling of chat**

Information overload is ‘Cognitive Diabetes’, says Slack’s CEO. Indeed, recent years have witnessed the unprecedented growth of social group chat usage characterized by an ‘always on’ nature, making it hard for users to catch-up; especially after logging off for a certain amount of time. Therefore, there is an urgent need to understand team conversations. This includes handling discussion thread disentanglement, and methods to explore conversation threads.

This research project is aimed at:

1. Research and create a unified model for topical segmentation of group-chat feed accounting for chat characteristics as text sparsity and social collaboration patterns.
2. Apply model as a chat-bot / service in IBM Watson Workspace group-chat.

**Required skills:**

- Independent, self-learner
- Good programming skills (preferably in Python / Scala)
- Proficiency and hands-on experience in machine learning
- Background in NLP and specifically graphical topic modelling is an advantage

Full/part time position: Summer internship.

Contact Details: Michalsh@il.ibm.com

**Information Retrieval group- Dialog-driven Aggregated Search**

Job description: Aggregated search is a distributed Information Retrieval setting where a user query may be served by several sources (verticals); Answers retrieved from various sources, should be further aggregated and displayed to the user in an optimal way so as to maximize user’s utility. In this research, we shall study aggregated search within a dialog (conversational) setting. A dialog paradigm sets new challenges for an aggregated search system, where various dialog-based constraints such as the context and dialog limited UI display should be taken into consideration.

The outcome of this research can be two-fold. We may publish a paper in a top-tier
IR/AI conference (e.g., SIGIR, CIKM, WWW, AAAI, IJCAI) focusing on the retrieval aspects of aggregated search in a dialog. Whereas, we may also publish a paper in an top-tier HCI conference (e.g., SIGCHI, IUI, RecSys, etc) focusing on the HCI aspects of such new search setting.

Required skills:
• Phd or Master level student in CS, EE or IS.
• Good programming skills (Java + JavaScript preferred).
• Basic knowledge in Information Retrieval (with preference to prior knowledge in advanced retrieval models or recommender systems).
• Prior knowledge with HCI techniques and UI development tools is a plus.

Full/part time position: Full time student position for the summer period in the Haifa area.

**Contact Details:** Michalsh@il.ibm.com

**IBM**

**Information Retrieval group- Personalized-Natural Language Generation (P-NLG)**

NLG is the natural language processing task of generating natural language from a machine representation system such as a knowledge base or a logical form. In an IR (search) setting, NLG produce a summary of the search results that were retrieved for a given user’s information need (query). In this research, we shall study how NLG can be further personalized based on specific user tastes, knowledge, personality or context. To this end, we shall explore both extractive and abstractive NLG techniques and shall develop novel personalization extensions to allow better generation for a given user. The result of this research shall be published in a top-tier IR/NLP/HCI conference (e.g., SIGIR, ACL, Recsys).

Required skills:
• Phd or Master level student in CS, EE or IS.
• Good programming skills (Java preferred).
• Basic knowledge in Information Retrieval (with preference to prior knowledge in advanced retrieval models, recommender systems or NLP).
• Prior knowledge with state-of-the-art IR, ML or NLP tools is a plus.
Full/part time position: Full time student position for the summer period in the Haifa area.

**Full/part time position:** Summer internship.

**Contact Details:** Michalsh@il.ibm.com

IBM

**IBM Cybersecurity Center of Excellence in Ben-Gurion University**

Analysis of System Security

Job description: Engage, under supervision of IBM researchers, in security analysis of complex systems, with the goals of (1) identifying how sophisticated attackers might exploit their vulnerabilities in intricate ways and modify their intended behavior, and (2) developing countermeasures to prevent/isolate the limit the effect of those exploits.

Required skills:
1. Excellent programming skills.
2. Prior experience in computer security.
3. Hands-on experience with static/dynamic code analysis and debugging tools.
4. Expertise in reverse engineering and malware analysis is an advantage.
5. Excellent interpersonal, written, and verbal communication skills.

**Full/part time position:** Summer internship.

**Contact Details:** Michalsh@il.ibm.com

IBM

**Intern for the Machine Learning for Healthcare research team**

Are you passionate about improving health? Are you passionate about the trending methods of machine learning and causal inference, deep learning, temporal modeling, reinforcement learning and transfer learning? If so, IBM machine learning research team provides such opportunities for you!

The Machine Learning for healthcare team in IBM Research is focused on developing novel
machine learning methods to analyze a wide variety of real data in the healthcare and life sciences domains. As a growing research team, our mission is to create world class machine learning solutions for our clients. We look for interns with background and research experience in machine learning, who are passionate to conduct cutting-edge research on challenging and trending open questions in the field.

**Requirements:**
Interns with background and research experience in machine learning are preferred.

**Full/part time position:** Summer internship.

**Contact Details:** Michalsh@il.ibm.com
**Company:** Marvell Israel

**Position (title of the project):** Job Description: Analyze different embedded processor products, identify key advantages and weakness, run benchmarks to investigate the systems performance, Participate in “tear down” of embedded processors boxes to study their design and create a detailed report on each system.

Ramping up applications and build CPU centric and networking demos on top of embedded processors community boards, can also include editing movies to be posted on YouTube.

**Requirements:** Computer Science \ Electrical Engineering (can be undergraduates over 3 years)

**Students (undergraduates or MSc/PhD students):** undergraduates over 3 years of study and MSc/PhD students

**Contact Details:** Arik Kit, akit@marvell.com, +972-54-7717310
With the ever increasing requirements for Data Center Bandwidth, research of Optical Data Centers Networks (ODCNs) has become one of the most acute challenges of the networks industry and academia. Amongst the most challenging problems in this field is scheduling of optical circuits.

The aim of this internship is to suggest and evaluate new schemes for ODCN circuits scheduling and their use. Several novel ideas we have been internally suggested but require next level of details, modeling and evaluations. Moreover, new approaches are also highly looked-for.

Successful internship will result in providing innovation for future products, writing academic paper and/or patent.

**Required Skills:** C++ programming, Networks course 1, Data Models, Algorithms,

Advantages: Experience in research, knowledge in Optical Data Centers.

Full time job during 3 months of summer 2018

Contact: eitan@mellanox.com

Cell based switching systems claim of fame is to provide a crossbar like behavior for a system built with discrete NICs and switch elements. It was successfully demonstrated for the case of over provisioned 2 level fat-trees that indeed it is possible to maintain crossbar behavior in the cost of additional latency and buffers at the NICs.

The aim of this internship is to extend the idea of “distributed crossbar” and apply it to an arbitrary number of levels, packet switched, and under provisioned fat-trees. We would like to suggest a novel NIC based algorithm that is capable to provide the maximal performance
for this system. The work should provide theoretical bounds, algorithms, limitations and evaluation of the proposed ideas.

Successful internship will result in providing innovation for future products, writing academic paper and/or patent.

Required Skills: C++ programming, Networks course 1, Data Models, Algorithms,
Advantages: Experience in research, deep understanding of TCP Congestion Control
Full time job during 3 months of summer 2018
Contact: eitan@mellanox.com

MELLANOX

Large Scale Telemetry

The need to perform monitoring of large systems to provide real time alerting for various faults and performance degradation events, is well recognized in both the HPC and the Hyperscale data centers environments. Mellanox devices provide unique features that directly support that need.

During this internship you will build a large scale simulation environment that mimic the Mellanox devices behavior, configure them and show the scalability of the monitoring system. A secondary effort that is also being considered is the implementation of the control mechanisms and the software involved in activating these features in the devices.

Successful internship focused on simulation will result in performing large scale simulations of the monitoring system under load, and writing academic paper and/or patent. Focusing on the device mechanisms will allow the intern to learn about the monitoring capabilities, the configuration protocols and the software involved.

Required Skills: C/C++ programming, Data Models, Algorithms,
Advantages: Fast learning and enthusiasm about new technologies.
Full time job during 3 months of summer 2018
Contact: eitan@mellanox.com
Device Level Congestion Control

During the last few years, the need for Hyperscale Data Center new Congestion Control algorithms has caught the attention of many of the networking researches. However, with the rise in network bandwidth, and consequently the exponential increase of packet rate, programming these algorithms in the host memory becomes too slow. In HotNet 2017 conference several papers discuss the need to smarter combination of hardware and software to keep up with the above challenge. Mellanox devices have kept up with this challenge by providing programmable congestion control scheme.

In this internship you will learn about that exciting new technology, program and evaluate (by simulation and measurement) several known congestion control algorithms. The key learnings of that study will influence the next generation Mellanox hardware, and possibly be published as a paper in coming Networking workshop or conference.

Required Skills: C++ programming, Networks course 1, Data Models, Algorithms,

Advantages: Experience in research, deep understanding of TCP Congestion Control

Full time job during 3 months of summer 2018

Contact: eitan@mellanox.com

Network Sensitive Job Scheduling

As the importance of parallel applications keeps rising, so grows the demand of intra data center bandwidth. Consequently Network aware Jobs Scheduling algorithms are gaining more and more attention. In Mellanox we have developed several scheduling algorithms to deal with Job Isolation for runtime predictability and also for being able to guarantee of network resources.

In this internship you will implement extensions to the Mellanox algorithms, simulate their use on real large clusters and evaluate their effectiveness. A successful completion of the
internship should lead to a publication material to be published in relevant conference or workshop.

**Required Skills:** C++ programming, Networks course 1, Data Models, Algorithms,

Advantages: Experience in research, Understanding Job Scheduling concepts

Full time job during 3 months of summer 2018

Contact: eitan@mellanox.com
Implementation and research of digital linearization techniques of radio frequency (RF) power amplifier (PA).

**Company:** Apple

Apple is inviting students of advanced degrees in EE, CS, CE to apply for a summer internship in our company. You will be based in one of our 2 sites (Haifa or Herzelia) and will be working with our teams on real problems that have real impact on Apple’s products.

We’re a diverse collection of thinkers and doers, continually reimagining what’s possible to help us all do what we love in new ways. The people who work here have reinvented entire industries with the Mac, iPhone, iPad, and Apple Watch, as well as with services, including iTunes, the App Store, Apple Music, and Apple Pay. And the same passion for innovation that goes into our products also applies to our practices — strengthening our commitment to leave the world better than we found it.

Join our development groups for a summer internship and get hands on exposure to some of the most challenging work in the industry.

**Project:** Implementation and research of digital linearization techniques of radio frequency (RF) power amplifier (PA).

**Job Description:** The RF PA is one of the most critical components in designing transmitters in wireless communication systems. The power consumption of transmitters is dominated by the power efficiency of the PA. Together with continuous demand for wider bandwidth and higher modulation schemes it requires PA with good linearity and power efficiency. The state of the art approach to meet these contradictory requirements is the design of a moderately linear PA with the additional implementation of a digital linearization techniques.

The student will research digital linearization techniques of RF PA, implement the algorithm in Matlab and validate the performance of the algorithm in the lab.

**Requirements:**
- Knowledge in communication or digital signal processing
- Knowledge and experience with Matlab or C/C++ programming
- Background in analysis of non-linear systems – an advantage
- Familiar with RF/HW lab work – an advantage
- Independent and self-motivated

**Students (for undergraduates MSc/PhD students):** PhD or Master level student in EE or CS

**Apply here:** [https://applecorp.avature.net/InternshipIsrael](https://applecorp.avature.net/InternshipIsrael)
Implementation and research of machine learning algorithms to wireless physical layer.

Job Description: Machine learning has been recently applied for many fields, such as computer vision and natural language processing, due to its expressive capacity and convenient optimization capability.

The student will research the applicability of machine learning algorithm for a wireless physical layer, implement the algorithm in Python/C++ and compare the performance of the algorithm to conventional communication system approach.

Requirements:
- Good analytical skills, self-learning capabilities
- Good programming skills (Python, C++)
- Knowledge in machine learning – mandatory
- Background in digital communication – an advantage

Students (for undergraduates MSc/PhD students): PhD or Master level student in EE or CS

Apply here: https://applecorp.avature.net/InternshipIsrael

Contact Details for any questions: Elin Hochstadt  ehochstadt@apple.com

Apple

Color and Depth Image Fusion

Job Description: We will implement and analyze state of the art techniques for fusing color and depth images to produce a single high resolution RGBD model. The depth and color images differ and spatial and temporal resolution. During the internship period, the student will study selected solution approaches, implement a computationally efficient processing environment, develop metrics for performance evaluation, and test the solutions on real imaging sensors.

Requirements:
- Experience DNN/CNN frameworks for vision and image processing.
- Hands on experience with Tensorflow.

Students (for undergraduates MSc/PhD students):
PhD or Master level student in EE or CS with a research topic in a relevant field.
Apple

**Adding 3D point cloud manipulation for data augmentation (for network training)**

**Job Description:** When dealing with DNN based detectors, data augmentation is a powerful tool for enhancing your data. For depth images, augmentation in the 3D space (point cloud) in a logical thing to do. The student will learn to deal with depth images and their representations and would implement data augmentation using python and TFRecords. He would then test the network performance and accuracy with and without these augmentations.

**Requirements:**

- Good analytical skills, self-learning capabilities
- Good programming skills (Python, Matlab, C++)
- Background in computer vision – an advantage
- Background in machine learning and DNN/CNN – an advantage

**Students (for undergraduates MSc/PhD students):** PhD or Master level student in CS, EE or IS

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Contact Details for any questions: Elin Hochstadt  [ehochstadt@apple.com](mailto:ehochstadt@apple.com)

Apple

**Anomaly detection algorithm implementation**

**Job Description:** Anomaly detection algorithms are non-supervised learning algorithms that detect abnormal or unexpected behavior of systems. The student will learn an anomaly detection algorithm from a journal paper, implement it in Python/C++, and test its performance compared to other algorithms.

**Requirements:**

- Good analytical skills, self-learning capabilities
- Good programming skills (Python, C++)
- Background in machine learning/anomaly detection – an advantage

**Students (for undergraduates MSc/PhD students):** PhD or Master level student in EE or CS or IS

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Contact Details for any questions: Elin Hochstadt  [ehochstadt@apple.com](mailto:ehochstadt@apple.com)
Apply here: https://applecorp.avature.net/InternshipsIsrael

Contact Details for any questions: Elin Hochstadt  ehochstadt@apple.com

Apple

Machine learning intern

Job Description: Turi Israel is working alongside the iPhone manufacturing Data Science team, in analyzing and improving manufacturing pipelines and processes. In this internship, you will work on massive datasets generated during the iPhone manufacturing process. You will research and experiment with state of the art statistical and algorithmic tools and apply them to this data, reach meaningful and actionable conclusions, and communicate your findings using advanced visualization techniques.

Requirements:

- Excellent analytical skills.
- Knowledge of supervised and unsupervised machine learning methods.
- Good programing skills (Python - an advantage).
- Background in anomaly detection – an advantage.

Students (for undergraduates MSc/PhD students): PhD or Master level student in CS, IS, Statistics or Industrial Engineering.

About The Turi Team: Turi is the core machine learning group at Apple. We generate tools for data scientists within and outside Apple. Some of our open source tools: Turi Create, CoreML, SFrame. Turi is headed by Prof. Carlos Guestrin from University of Washington, we have more than 15 PhDs specializing in distributed systems, machine learning and statistics.

Apply here: https://applecorp.avature.net/InternshipsIsrael

Contact Details for any questions: Elin Hochstadt  ehochstadt@apple.com

Apple

Deep learning research internship

Project: Deep learning research internship: cutting edge deep learning computer vision project for the Implementation and research of high noise low signal cosmetic anomalies detection and localization in images of Apple products during the manufacturing process.
**Job Description:** The cosmetic requirement of apple products is very strict and even very small anomalies are unacceptable. This poses a great challenge to detect these minute variations in the image.

The student will research various deep learning method for detection of anomalies in images (supervised and unsupervised). Implement the algorithm in python and validate using real manufacturing data.

**Requirements:**
- PhD or Master level student in EE or CS
- Knowledge in python
- Knowledge and experience with deep learning vision algorithms and frameworks like TensorFlow, MxNet, PyTorch etc.
- Independent and self-motivated

**About The Turi Team:**

Turi is the core machine learning group at Apple. We generate tools for data scientists within and outside Apple. Some of our open source tools: Turi Create, CoreML, SFrame. Turi is headed by Prof. Carlos Guestrin from University of Washington, we have more than 15 PhDs specializing in distributed systems, machine learning and statistics.

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**Contact Details for any questions:** Elin Hochstadt ehochstadt@apple.com

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**Apple**

**Deep learning research internship**

cutting edge deep learning computer vision project for the Implementation and research of high noise low signal cosmetic anomalies detection and localization in images of Apple products during the manufacturing process.

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**Requirements:**
- PhD or Master level student in EE or CS
- Knowledge in python
• Knowledge and experience with deep learning vision algorithms and frameworks like TensorFlow, MxNet, PyTorch etc.
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Contact Details for any questions: Elin Hochstadt  ehochstadt@apple.com

Apple

Functional Formal Verification and Specification of Hardware Design

Job Description:  Apply state of the art tools and techniques to verify the logical correctness of Apple hardware units. Explore and study areas such as: formal verification planning, advanced techniques in bug hunting, formal verification coverage and the integration of formal techniques with the more classical approaches of dynamic simulation. Suggest enhancements to existing flows and use models to prove their concepts.

Requirements:  Ph.D. Student in CS with focus in the area of formal verification

Apply here:  https://applecorp.avature.net/InternshipIsrael

Contact Details for any questions:  Elin Hochstadt  ehochstadt@apple.com
TSG Advanced Systems Ltd

Strategic C2 Systems Department - Research associate

**Company:** TSG Advanced Systems Ltd.
**Position:** Strategic C2 Systems Department - Research associate

**Job description:** As a research associate, you will plan, organize, and conduct research upon approval of the principal investigator. You will design, test, and evaluate methods and protocols for research in the field of machine learning in the electronic warfare domain; you will also analyze, summarize, and organize collected data together with principal investigator.

Applicable research products will be candidates for future deliveries of a unique strategic C2 EW system developed for unique customers.

**Required skills:**

1. Eager to learn and passionate about new technologies.
2. Knowledge in RF.
3. Knowledge in Sensors – very high rate raw physical layer signals.
4. Knowledge in Machine Learning and Specifically in Neural Nets Models: Supervised and Unsupervised, RNN, LSTM, ConvNets, Prediction and Anomaly detection.

**Students:** MSc/PhD students

**Contact details:** Gilad.Sharoni  Gilad.Sharoni@tsgitsystems.com