VIP Research Internship Opportunities

SUMMER 2020

Fall 2020 Opportunities TBA

All internships involve a **120-150 hour commitment** and are worth **3-US Credits.**

Department/ Research Center	Research Internship Project *Student Duties & Responsibilities*	Requirements
Communications	Book Research Assistant: Bob Marley and Media Representation *Assist with Online Data Collection.*	*Some Research Knowledge in Media or Sociology.*
Management & MIS	Developing material content for 40 topics in relation to smart cities development, project in collaboration with DEVOPS (*https://devops.uth.gr/dev/*). *Assist with composition of study guides for the courses, which span many cognitive topics in management, DEVOPS, information systems, and smart cities. Interested students may come from diverse backgrounds.*	Background in: *Business* *MIS* *Computer Science* *Public Administration*
	Project in Collaboration with The European Network for Academic Integrity (*https://www.academicintegrity.eu/wp/*). Focus on Online Support Group for Victims of Academic Integrity. *Assist with management of online support group, proofreading/developing content and scheduling replies to inquiries.*	Background in: *Business* *MIS*
Politics & Governance	**Research Assistant on the Topic:** Understanding the Different Approaches of the US and Germany in Addressing Economic Crises. *(Re: 2008-2013, COVID-19).* *Research related to literature review.*	Background in: *European Studies* *International Relations* *Political Science* *History*
	Research Assistant on the Topic: The US perceptions and policies in the Eastern Mediterranean and the broader area following the end of the Cold War. *Research related to literature review.*	
	Research Assistant on the Topic: Energy issues in the Eastern Mediterranean: How important and how relevant. *Research related to literature review.*	

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Institute for the Future *(IFF)*	**Blockchain Forensics** Use Machine Learning Algorithms *(e.g., Unsupervised Techniques)* for Detecting Suspicious Events in Blockchain Transactions. *Research Assistant*	Computer Science *(or Related)* *Applicants need to be at least in the 3rd year of his/her Bachelor studies, with previous experience on programming and basic understanding of machine learning methodologies.*
	Ripple - Optimization of Consensus Algorithms in Private Blockchain Networks *Research Assistant*	
	Fusion of Independent Machine Learning Models Using Smart Contracts Experiment with Various ML Algorithms and Develop a Fusion Scheme on a Blockchain. *Research Assistant*	
	Raspberry Pi Blockchain RFID Scanner Raspberry Pi Blockchain RFID Scanner. Enabling those interested to send RFID tag data to a blockchain *(e.g., EOS)* for enabling logistics, supply chain, manufacturing, tracking and access control use-cases. The project uses a Raspberry Pi as an IoT device and the blockchain as the global distributed platform/database. *Research Assistant*	Computer Science *(or Related)* *Applicants need to be at least in the 2nd year of his/her Bachelor studies, with previous experience on programming and basic understanding of machine learning methodologies.*
	Forecasting Using Machine Learning and Support The Makridakis Open Forecasting Center *(MOFC)* Research Team *Research Assistant*	*Applicants need to be in at least their last year of their Bachelor's Degree with either a background in* Statistics *or* Computer Science*. Some experience with machine learning required, ideally including linear regression, random forests, and neural networks. Prefer that the applicants are proficient in Python or R and provide a sample of their programming work.*

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Institute for the Future *(IFF)*	**Marketing** For Makridakis Open Forecasting Center *(MOFC) - Conducts Cutting-Edge Forecasting Research* - (*https://mofc.unic.ac.cy/*) and Decentralized Conference - *World's Premier Learning Conference on Blockchain and Digital Currencies* - (*https://www.decentralized.com/*). *Social Media Content / Campaigns Creator*	*Applicants need to be at least in the 3rd year of his/her Bachelor studies, with previous experience in social media marketing and knowledge of Photoshop.*
	Newsletter Creator For Makridakis Open Forecasting Center (*https://mofc.unic.ac.cy/*) and Decentralized Conference (*https://www.decentralized.com/*). *Marketing Assistant*	*Applicants need to be at least in the 3rd year of his/her Bachelor studies, with previous experience in Journalism to create a weekly newsletter for IFF and MOFC.*
	Human Trafficking *(Mini Project)* Study on how Blockchain can be used in assisting to combat human trafficking and organize an event in Cyprus. *Research Assistant*	Preliminary/Foundational Knowledge on: *Economic Analysis, Computing, Data Science, as well as hands-on experience on using existing technologies to solving real-world challenges.*
	Government to Adopt Blockchain Technology Research Policies Required to Adopt Blockchain. *Research Assistant*	
	Healthcare Sector Study on how Blockchain can be used in the Healthcare Sector (Ranging from Pharmaceuticals to Doctors to Natural Disasters, etc.) *Research Assistant*	
	General Social Issues ***(Gender and Other Societal Issues)*** Impact of Blockchain on Society – Study. *Research Assistant*	
	Smart City Using Blockchain Technology *(Mini Project)* Discover the uses of this technology and prepare a project on how this technology can be applied to Nicosia City. *Research Assistant*	

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Computer Science	**Timely Detection of Uncertainty in Machine Learning Processes** The goals of this project are: *(i)* understand how uncertainty affects ML models and subsequent predictions; *(ii)* design algorithmic technique for detecting uncertainty in ML processes; and *(iii)* apply the designed technique in an application of interest. Such applications can be industrial IoT *(manufacturing)*, drone flight control, biosignal monitoring with wearables. *Research Assistant*	*Comfortable with programming in either C/C++, Python or R.*
	Adaptive Sensing for Drones One of the most prominent functionalities of drones is their ability to monitor the environment they are deployed in. This is achieved by embedding various sensing modules capturing aerial images and video streams, environmental signals, and positioning coordinates and drone vital. The goal of this project is to design a *(self-)* adaptive algorithmic process to ease energy consumption and data processing on drones by dynamically altering the intensity of sensing tasks. *Research Assistant*	*Comfortable with programming in either C/C++, Python or R.*
	Data Routing for Drone Swarms With advances in fog computing, drones can now form swarms, share and process data, and collaboratively achieve a common goal *(e.g., pinpoint survivor hotspots)*. The goal of this project is to design a routing mechanism that can be integrated with the communication interfaces of drones to support multi-hop routing over geo-distributed drone swarms. *Research Assistant*	*Comfortable with programming in either C/C++, Python or R.*
	Develop Mobile App Features Using X Platforms APIs This project aims at developing a cross platform mobile application using either React Native or Flutter or Swift or any other native development libraries. The prospective intern student will be able to advance existing libraries we have developed and use customized APIs to develop further features for a specified context application. *Research Assistant*	*Programming in any of the platforms such as Flutter or Swift and/or React Native.*

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Computer Science	**Post-mortem Attack Tracing** SMAD is an open source, configurable and extensible System Monitoring and Anomaly Detection framework based on Sysdig, developed at the University of Nicosia Informatics Security Lab, which monitors kernel and system resources data based on user-defined configurations that initiate non-intrusive actions when alerts are triggered. The aim of this internship is to prepare and conduct attacks on a server running SMAD and perform post-mortem analysis of those attacks using SMAD. The student should be able not only to form a timeline of the malware-related system calls but also determine what vulnerability was exploited, how and when it was exploited. *Research Assistant*	*Computer security or Network Security prerequisite.*
	Smart Contracts for a Secure, Anonymous and Verifiable Blockchain-Based e-Voting Framework Research and commercial approaches on electronic voting exist and the recently emerged blockchain technology has given this research area yet another boost. The Informatics Security Laboratory at University of Nicosia is currently implementing TeV, a blockchain-based e-voting framework, that wraps not only the required key elements for secure and verifiable e-Voting but also additional features such as support for re-voting, post-election vote check and voting channel preference. The aim of the internship is to explore additional features that could leverage TeV, including the use of smart contracts during all phases of the electoral process. *Research Assistant*	*Computer security or Network Security prerequisite.*
	Rethinking Cybersecurity under the Net Neutrality Princinple Net neutrality is closely related to the open internet vision. It advocates for the fair treatment of all internet traffic, requiring ISPs to treat equally all data that goes through their networks. The aims of this internship are two fold: first, to investigate and assess the security risks of net neutrality and second to demonstrate possible abuse of net neutrality by malicious actors via simulation of attack vectors including DDoS. *Research Assistant*	*Computer security or Network Security prerequisite.*
	TV Series Recommendation Application The purpose of the project is to build an application *(Web or Mobile)* where the user *1)* logs-in, *2)* enters the TV show she/he has just completed watching, *3)* a rating for that TV show *(from 1 to 5)*. *Research Assistant*	Good programming skills. *Basic Knowledge of Data Mining concepts is a plus.*

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Computer Science	**Predicting Student Drop-Out** High student attrition rates is a serious concern in tertiary education which affects students, universities and societies in general. Early detection of at-risk students offers the opportunity for Universities to provide guidance and support to these students. This project is concerned with the development of a data-driven, Artificial Intelligence system that will enable the prediction of student drop-out, using administrative data. Various Machine Learning techniques will be investigated and applied for the purposes of this project. *Research Assistant*	*Very good programming skills. Interest in the area of Artificial Intelligence/Machine Learning.*
	Educational Data Mining The purpose of this project is to investigate the numerous applications of data mining to the educational process. Today, a lot of software tools are used in order to enhance the student's learning experience. Many of those technologies are data-driven. This means that historical, or real-time data are explored in order to understand student difficulties or get insights regarding student behavior in relationship to the educational material. In the era of online, distance learning and massive online open courses *(MOOCs)* this practice is of vital importance. In this project, recent methodologies of mining educational data will be studied and a set of off-the-shelf analytic techniques will be evaluated on available educational data sets. *Research Assistant*	Good programming skills. *Basic Knowledge of Data Mining concepts is a plus.*
	Opinion Explorer The purpose of the project is to develop a software that will help users read a set product reviews in a convenient way. The software should be able to load a list of reviews and display them to the user in a nice interface. On top of listing the reviews the system should highlight critical words of phrases in that review as hyper-links. *Research Assistant*	Good programming skills.
	Numerical Methods and Basic Theory for Solving Ordinary Differential Equations The purpose of the project is to develop and implement various finite-difference schemes for solving Ordinary Differential Equations. This will include methods for first-order equations as well as two-point boundary value problems. Depending on the student's level and interests specific examples and applications can be examined *(e.g. first-order nonlinear systems -> SIR model for epidemics, second-order equations -> elastic and electrical vibrations)*. *Research Assistant*	*i) Good knowledge of one of the following programming languages: Python, C++, MATLAB or Fortran* *ii) Must have taken a Course in Ordinary Differential Equations (MATH-330)*

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Life & Health Sciences	**Scorpio Venom Peptides Against SARS-CoV-2** The project aims to identify in silico scorpion antiviral peptides or antimicrobial peptides potential to inhibit SARS-CoV-2 attachment to the host cell by binding the ACE2 receptor or TMPRSS2 receptor disrupting their interaction with the RDB domain of the spike protein S of the virus. There are specific databases with antiviral peptides and antimicrobial peptides that are reported in the past for their antiviral activity against SARS or MERS. This is the starting point. By using open source software we can predict their 3D structures, if not yet predicted, and then we can test them in silico for their similarity and their ability to bind to ACE2 receptor and disrupt its interaction with the RDB domain of the spike protein S and/or their ability to act as inhibitors for 3CLpro or PLpro. In addition, we can design our own modifications and compare the 3D structures in silico with the 3D structures of the already reported antiviral peptides. *Research Assistant*	*Passion for science, good knowledge of organic chemistry and biology, IT skills.*
	Development of a Database that Contain Short Peptides *(Up To 5 - 8 AA)* Self Assembled Nanostructures The project aims to build a database with short self assembled peptides will work as a platform for the design and experiment novel applications of these magnificent peptides. To collate the information for the self assembled peptides scientific databases and patent repositories will be used. Specific keywords like “pentapeptide” AND “hydrogel” will be the first step for their classification. Afterwards the peptides will be classified according their length, their N-terminal and C-terminal modifications, their activity, their applications, etc. *Research Assistant*	*Passion for science, ability to search in scientific databases, good knowledge of organic chemistry and biology, IT skills, willing to learn to design and use softwares like chemsketch, chemdraw, Avogadro, Samson and work with Webtools like SWISS-ADME, etc.*
	In Silico Identification of Tau Aggregation Inhibitors as Potential Therapeutics of Alzheimer’s Disease using Similarity Approach The project aims to find compounds similar to known tau aggregation inhibitors such as curcumin *(also β amyloid aggregation inhibitor used as a positive control in in vitro tau aggregation assays)* or other compounds in clinical trials, and prioritize them according to properties including toxicity, lipophilicity, mutagenicity etc. The aim is to identify in silico other compounds that can be used as aggregation inhibitors that can eventually be verified by testing in vitro for activity. *Research Assistant*	*Good knowledge of chemistry and biology.*

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Life & Health Sciences	**Investigation of Chemical and Physicochemical Properties of Small Molecules which Prevent SARS CoV-2 Entry by Elevating the pH of Endosomes** To identify the drugs tested preclinically or being tested clinically and found to be strong candidates to become useful clinical tools against SARS CoV-2, and to investigate their chemical and physicochemical characteristics like pKa, log P, molecular surface etc. Clinical Trial databases will be checked in order to identify the basic drugs being tested against SARS COV-2. Then their chemical and physicochemical characteristics will be calculated using open access software and databases like Pubchem, ChEMBL, SWIS ADME, MEDCHEM Designer. *Research Assistant*	*Good knowledge of chemistry and biology.*
	Natural Products with Inhibitory Effects Against Enzymes Linked to Alzheimer's The project aims to review the available data on chemical compounds of plant origin with promising inhibitory effects against the enzymes *(AChE and BChE)* and build a database of the most promising compounds. To collate the information on plants and plant-derived ChE inhibitors using scientific databases and patent repositories. Finally, the phytochemicals reported in literature will be classified according to their chemical class and activity/efficacy *(e.g. IC50 value)* as well as the model used for testing their activity (in vitro vs. in vivo), etc. *Research Assistant*	*Ability to search in scientific databases, good knowledge of chemistry and biology.*
	Review of Zoonotic Diseases Transmitted from Birds to Humans The spread of zoonotic diseases to humans either from livestock, pets and wildlife have constituted serious public health issues in human populations for thousands of years. In this study we will investigate the prevalence of zoonotic diseases that may be transmitted to humans by migratory birds, and the potential impacts on human health. This will include database searches concerning zoonotic diseases; investigation of the categories and types of diseases and methods of transmission from vectors to hosts; assessment of seriousness of diseases and methods of control/containment. *Research Assistant*	*Good knowledge of chemistry and biology.*

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Life & Health Sciences	**Birds as Indicators of Microplastic Pollution** The use of birds to monitor environmental conditions is widespread, and birds are commonly used as indicators of environmental pollution. The aim of this study is to review the literature to *(1)* Identify the extent of microplastic bioaccumulation in birds, *(2)* Discuss the evidence for health impacts on birds and other wildlife, and *(3)* Discuss the implications of pollution in terrestrial and aquatic environments. A literature review on the presence of microplastics in various bird species, and the impact on wildlife and the environment. Database searches, review of literature, data comparison between studies. *Research Assistant*	*Good knowledge of chemistry and biology.*
	A Meta-Analysis of Songbird Poaching in the Mediterranean and Middle East In the Mediterranean and Middle East regions, hunting and consumption of songbirds took place for hundreds of years, for subsistence purposes and a supplement for meagre diets. The last few decades, however, this practice has been outlawed in many European and some Middle Eastern countries. Nevertheless, it continues to take place, and in some countries has reached industrial proportions. In this study we will review anthropological and behavioural studies, and collate detailed data from published literature. A meta-analysis of data will be conducted, to determine whether trends of poaching in the Mediterranean and the Middle East are increasing or decreasing. A systematic review of published literature; collation of published data in studies spanning more than 10 years; meta-analysis of the published data to determine overall trends. *Research Assistant*	*Good knowledge of chemistry and biology.*