List of Potential Hosting Institutions for Professor Charles K. Kao Research Exchange Scholarship 2021

	Institution	Department/Professor Nominated	Topics/Areas of the Research Project	Student Place(s) Available
1	University of Pennsylvania	Professor A. T. Charlie Johnson Rebecca W. Bushnell Physics and Astronomy Website: http://nanophys.seas.upenn.edu/	Biosensors based on 2D materials	1
2	Columbia University	Professor X Edward GUO Director Bone Bioengineering Lab Website: http://bme.columbia.edu/x-edward-guo	Bone biomechanics, mechanobiology of bone, imaging analysis of bone microstructure, biomechanics of bone cells, micro-patterning of cells	1-2
3	Michigan State University	Professor Zhen QIU Assistant Professor Department of Biomedical Engineering Website: https://www.egr.msu.edu/people/profile/qiuzhen	Biomedical optics, MEMS/MOEMS, multi-modal targeted imaging, wearable and implantable medical devices.	1-2
4	Mayo Clinic (Rochester)	Professor Cadman L. Leggett, M.D. Department of Internal Medicine, Division of Gastroenterology and Hepatology. Website: https://www.mayoclinic.org/biographies/leggett-cadman-l-m-d/bio-20420253	Gastroenterology, advanced imaging in Barrett's esophagus, application of artificial intelligence to diagnostic endoscopy	1

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5	Technika University of Gdańsk, Poland	Professor Małgorzata Szczerska Associate Professor Department of Metrology and Optoelectronics Website: https://pg.edu.pl/30c9e61c56_malgorzata.jedrzejewska-szczerska	Fiber optic sensors	1-2
6	Chang Gung University, Taiwan	Professor Thomas Kin Fong Lei Professor Graduate Institute of Biomedical Engineering Website: https://sites.google.com/site/cgubiomems/	Cell culture in microfluidic device	2
7	University of Waterloo, Canada	Professor Evelyn Yim Associate Professor Department of Chemical Engineering Website: https://uwaterloo.ca/chemical-engineering/profile/eyim	Vascular graft development	1-2
8	University of New South Wales, Sydney, Australia	Dr. Kang Liang Senior Lecturer School of Chemical Engineering Website: https://research.unsw.edu.au/people/dr-kang-liang	Nanostructured materials, biomaterials, nanobiotechnology, nanobiointerface, biomimetic materials, porous materials, metal-organic frameworks, polymers, biocatalysis, nanotechnology	1

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9	University of New South Wales, Sydney, Australia	Dr. Sophia Gu Senior Lecturer School of Chemical Engineering Website: https://research.unsw.edu.au/people/dr-sophia-gu	Drug delivery, Bio-imaging nanoprobe construction and application, Theranostic nanomedicine, Bio-nano interface, Nanozyme, Nanoparticles for cancer therapy, cardiovascular disease, Nanoparticle synthesis and modification, Two-dimensional nanomaterials	1
10	Sichuan University, China	Professor Junling Guo Biomass Science and Engineering National Global Talents Recruitment Program Website: https://www.bmicenter.org/prof-junling-guo	Biophysics, biomaterials, electron microscopy	1-2

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11	Carnegie Mellon University, U.S.A.	Professor Pulkit Grover Assistant Professor Electrical and Computer Engineering Carnegie Mellon University Website: https://www.ece.cmu.edu/directory/department/faculty/G/Pulkit_Grover_7070.html	1. analyzing neural data for sensing and stimulation using machine learning. 2. fair, explainable machine learning: a study of hiring data	2
12	University of Bristol	Professor Oliver Johnson Professor School of Mathematics Website: https://research-information.bris.ac.uk/en/persons/oliver-t-johnson	Group testing (sometimes called pooled testing) is a way of efficiently screening large populations for disease when the availability of tests is constrained – as a result this has found application in many countries during the COVID-19 pandemic. This project will involve coding and testing algorithms in a variety of realistic scenarios, with the possibility to prove theoretical results if possible. (Further reading: survey monograph https://arxiv.org/abs/1902.06002)	1

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13	University of Bristol	Professor Sidharth Jaggi Associate Professor School of Mathematics Website: https://research-information.bris.ac.uk/en/persons/sidharth-sid-jaggi	1. Adversarial Machine Learning: A theoretical/mathematical investigation of how to make machine learning algorithms robust to adversarial noise. 2. Group testing: See this for baseline knowledge https://arxiv.org/abs/1202.0206 For both projects, a strong background in mathematics (in particular probability theory/combinatorics/information theory) would be necessary.	1-2
14	University of Bristol	Professor Joel Goldstein Professor School of Physics Website: http://www.bristol.ac.uk/physics/people/joel-goldstein/overview.html	(Data Science) The Mu3e experiment, soon to start taking data, will search for physics beyond the standard model in the form of lepton flavour-violating muon decays. Up to 10^8 muon decays per second will need to be detected, reconstructed, and analysed in real time. This will require the use of novel detector hardware and a cutting-edge data processing system, incorporating new advances in algorithms.	1

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15	University of Bristol	Dr. Helen Heath School of Physics Website: http://www.bristol.ac.uk/physics/people/helen-f-heath/overview.html	(Data Science) The NA62 Experiment at CERN is aiming to study the very rare decay $K^+ \to \pi^+ \nu \bar{\nu}$. This decay has a branching fraction of 10-10. The large sample of decays need to find this very rare process also allow for the study of decay channels that are much more common. For example, there ~10 decay modes with branching fractions of about 10-5 and, in many cases, these are poorly studied. The NA62 data sample offers the opportunity to study many of these decays and measure their properties to world leading precision. We have been investigating the possibility of making a world leading measurement of the Kµ4 decay ($K \to \pi^+ \pi^- \mu^+ \nu_\mu$. Our investigations indicated that this study might be possible and the aim of this project would be to study systematic effects to understand the precision that could be obtained.	1

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16	University at Buffalo (The State University of New York)	Professor Michael Langberg Professor Department of Electrical Engineering Website: http://engineering.buffalo.edu/ee/faculty/faculty_directory/michael-langberg.html	1. Codes with restricted decoding sets. In this project we will study the qualities of error-correcting codes in which only certain sets of codeword entries (specified by a given hyper-graph) may be corrupted. Knowledge in the following areas will be very helpful: probability theory, graph-theory/combinatorics, linear algebra, coding theory (advantage), information theory (advantage). 2. Time-constrained communication. In this project we will study the qualities of communication systems focusing on the notion of decoding-time. Knowledge in the following areas will be very helpful: probability theory, combinatorics, information theory (advantage).	1-2

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17	University of Warwick	Dr. Emma MacPherson Department of Physics Website: https://warwick.ac.uk/fac/sci/physics/staff/academic/emacpherson/	Terahertz imaging and applications	1-2
18	National Chiao Tung University	Professor Chow Chi Wai Department of Photonics Website: https://www.researchgate.net/profile/Chi_Wai_Chow	Photonics, Optical communications	1-2
19	University of Georgia	Dr. Mable Fok Assistant Professor College of Engineering Website: http://wave.engr.uga.edu/mfok/index.html	Photonics	1-2