ERIN O'SULLIVAN

Uppsala University ◇ Uppsala, Sweden
erin.osullivan@physics.uu.se ◇ http://icecube.wisc.edu/~eosullivan

Education

– PhD in Physics 2014, Queen's University, Canada

Current and Previous Positions

– 2019 – present: Senior Lecturer, Uppsala University, Sweden

– 2017 – 2019: Postdoctoral Fellow, Stockholm University, Sweden

– 2014 – 2017: Postdoctoral Fellow, Duke University, USA

Grants held as a PI

– 2020 – 2024: Starting grant from the Swedish Research Council for "Neutrinos from supernovae in IceCube and Hyper-Kamiokande" (3,300,000 SEK)

– 2018 – 2019: Research grant from Stockholm University for the project "New Windows to the Universe: The Hyper-Kamiokande Neutrino Experiment" (150,000 SEK)

Scientific Leadership

– 2020 – present: Co-convener for the "Neutrinos from natural sources" topical group of Snowmass2021, the decadal planning exercise for the US high energy physics community.

– 2020 – present: Member of the Particle Physics Division board in the Swedish Physical Society, co-organizer of the Swedish particle physics annual meeting (Partikeldagarna2020)

– 2020 – present: Co-lead of the supernova physics working group in IceCube

– 2019 – present: Convener of the firedrill work package for the SuperNova Early Warning System (SNEWS2.0)

– 2018 – present: Swedish member of the Hyper-Kamiokande International Board of Representatives, a committee of 25 physicists that is charged with collaboration governance, steering, and the promotion of funding requests internationally

– 2018: Co-coordinator and corresponding author of the recent Hyper-Kamiokande design report (arXiv:1805.04163)

– 2016 – present: Co-convener of the software working group in Hyper-Kamiokande

Selected publications and proceedings as corresponding author/lead analyzer

(45 refereed publications with 1830 total citations and h-index of 19 (NASA/ADS))

– Segerlund, M., O'Sullivan, E., O'Connor, E. (2020), Measuring the Distance and ZAMS Mass of Galactic Core-Collapse Supernovae Using Neutrinos, to be submitted to Physical Review Letters.

  In this paper, I supervised a masters student thesis, looking at how the supernova neutrino signal can be used to extract key parameters which would enable observers to view the first light from a supernova. We found that it was possible to estimate the distance and constrain the zero age main sequence mass. The distance estimate can help observers determine if the supernova occurred on the opposite side of the galaxy, implying that there may be significant dust obscuration, or if it is very nearby which would imply that may be very bright. The mass estimation also can help to determine the delay time between the neutrino signal and the photons. We plan to incorporate this work into the SuperNova Early Warning System.

– Westernacher-Schneider, JR. *et al.* (2019) Multimessenger asteroseismology of core-collapse supernovae, Physical Review D, 100, 12

  In this theory paper, we looked at how neutrinos and gravitational waves, when taken together, can be used to investigate rotations deep in the core of core-collapse supernovae.

– O'Sullivan, E. and Finley, C. [IceCube Collaboration] (2019), Searching for Time-Dependent Neutrino Emission from Blazars with IceCube, PoS-ICRC2019-973, paper for Astrophys. J. in prep

  This paper is the follow up to the identification of the first likely neutrino emitter, the blazar TXS 0506+056. We used the Fermi 3LAC catalog to identify the positions of blazars, and used the archived IceCube neutrino data to look for emission of high energy neutrinos from these directions. We found no other candidate as significant as TXS 0506+056, but this publication provides a list of which other blazars might be interesting for follow up.

– Abe, K. *et al.* [Super-Kamiokande Collaboration] (2017), Search for an excess of events in the Super-Kamiokande detector in the directions of the astrophysical neutrinos reported by the IceCube Collaboration, Astrophys. J., 850, 2

  We looked in the directions of the IceCube high energy starting sample and searched for an excess of GeV-scale neutrino events in the 20 year Super-Kamiokande data set. This represented the first time we performed an astrophysical search using IceCube events at Super-K, and the best search of these directions at neutrino energies <100 GeV.

– Abe, K. *et al.* [Super-Kamiokande Collaboration] (2016), Search for Neutrinos in Super-Kamiokande associated with Gravitational Wave Events GW150914 and GW151226, Astrophys. J. L., 830, 1

  This paper looked for neutrinos coincident in time with the first two LIGO gravitational wave events. This was the most sensitive search for neutrinos below 100 GeV. The null result was used to set upper limits on neutrino emission from the event.

Selected presentations
(17 total invited presentations since 2015, including 2 international summer schools)

– Pufendorf Real-time data seminar, Lund, Sweden (virtual), March 2020. "Real-time broadcasting of astrophysical neutrino alerts"

– New windows to the Universe symposium, Royal Swedish Academy of Sciences, Stockholm, Sweden, November 2018. "Neutrino Astronomy with IceCube"

– 16th Conference on Flavor Physics and CP violation, Hyderabad, India, July 2018. "Latest results from IceCube and status of future astrophysical neutrino experiments"

– Caltech Gravitational Wave Astrophysics School, California Institute of Technology, Pasadena, California, July 2015. "Neutrinos and Neutrino Detection"

Supervision

– Nora Valtonen-Mattila (PhD student): Main supervisor 2020 – present

– Ankur Sharma (postdoc): 2020 – present

– Main supervisor of 2 Masters theses: 2018 – 2020

Publications

See this list with the associated links at my NASA/ADS library: `https://ui.adsabs.harvard.edu/public-libraries/iNXvJ_x4SU6SIdgOPQbyxA`