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To Whom It May Concern:

It is my pleasure to write this letter of recommendation for Mr. Andrew Voyles to be awarded a Schmidt Science Fellowship to pursue studies in the end-to-end development of new radiopharmaceuticals. I believe that he is ideally suited for the goals of this new fellowship, and would be an excellent member of its inaugural class.

Mr. Voyles has worked with me over the last 4 years as a graduate instructor and researcher, starting with his arrival at Cal in the Fall of 2014. At this time, I was on sabbatical leave from Lawrence Livermore National Laboratory to perform research in High Energy Density Physics in collaboration with researchers from UC Berkeley and Lawrence Berkeley National Laboratory (LBNL).

Mr. Voyles was a student in the introductory nuclear physics course I taught (NE101), and he quickly distinguished himself not only as an excellent student, but also for his wide range of interests and technical abilities. Andrew became involved in our effort to develop a new type of plasma-based high-flux neutron generator (HFNG) for use in geochronology research. He designed the computer that we used for modeling and simulations, and quickly became an invaluable member of our research team, helping to commission the facility and produce some of its first science results. Andrew could clearly have remained entirely focused on our work at the HFNG and earned a Ph.D in its development in the same way that his predecessor, Dr. Cory Waltz did[[1]](#footnote-1).

However, Andrew’s interests were quite wide-ranging, and when he heard that I was part of another collaboration with researchers from the Institute for Laser Energetics at Osaka University to search for evidence of nuclear-plasma interactions in laser-driven inertial confinement fusion systems, he desired to become involved, fielding the experiment in Osaka. This collaboration involved doping mm-sized deuterium-tritium capsules with isotopes that could potentially be activated via neutron-induced reactions, imploding them using the GEKKO-LFEX laser, collecting the debris post-shot, and observing any radioactive decay products using high-resolution gamma-ray spectroscopy. Andrew excelled in the work, and my colleagues from Osaka were impressed by both his talents and dedication to the project.

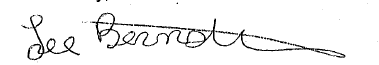
Andrew enjoyed his “Japanese Adventure”. However, while he found the subject matter interesting, it didn’t satisfy his desire to perform work which had the potential to improve the welfare of humanity in general. As a result, upon his return to Berkeley he became heavily involved in a nascent program that we started at Cal and LBNL to develop new radioisotopes for the treatment and diagnosis of illness. This effort, which grew out of the first Workshop for Nuclear Data Needs and Capabilities for Applications[[2]](#footnote-2) involved using both the 88-Inch cyclotron at LBNL and the HFNG at UC Berkeley. Andrew immediately became involved in experiments at both facilities. This work culminated recently in his first publication, involving a measurement of the production cross section for medical radionuclides using the HFNG, and quantifying the ability of compact neutron generators to produce these nuclides locally for use in medical applications[[3]](#footnote-3). Andrew also took the lead in two other experiments at LBNL and the Isotope Production Facility at Los Alamos National Lab. In September he presented these results as a part of his Ph.D. qualifying examination, easily passing the exam, and leading one of his examiners, Prof. Joseph Cerny from the Department of Chemistry at Cal to remark on the wide range of work he had accomplished during such a short time at Cal.

Also during this time, Mr. Voyles became involved in another research collaboration I am a part of, involving researchers from the University of Oslo in Norway. The Oslo group specializes in measuring the properties of highly-excited nuclear states that are critically-important inputs for modeling nuclear reactions in astrophysical settings. We realized at that point that his work in medical isotope production provided a unique window into determining these properties, and he was invited to present his results at the recent 6th Workshop on Nuclear Level Densities and Gamma-Strength in the Continuum in May 2017[[4]](#footnote-4).

During his visit to Oslo, Mr. Voyles met several members of the radiochemistry group there. There was an immediate resonance between them, and they decided to submit a Marie Curie fellowship proposal to perform an end-to-end research program to develop 211At, 103Pd, and 44Sc, as a targeted alpha therapy, targeted Auger therapy, and novel PET imaging isotope, respectively. This proposal ideally leveraged the combination of nuclear science and engineering expertise that Andrew has built during his time at Cal and the technical talents and capabilities in the Oslo radiochemistry group. Unfortunately, after writing the entire proposal we discovered that since he would not have completed his Ph.D. prior to Fall 2017 he was not eligible to receive a Curie fellowship. Undaunted by this, the Oslo group has arranged to have Andrew spend the first 6 months of 2018 in Norway to start performing some parts of the research proposal.

As I mentioned above, Andrew has always been motivated by a desire to help people. Therefore, despite his manifold research projects, and the fact that he is fully-supported on a Nuclear Regulatory Commission Fellowship, he decided to become a Graduate Student Instructor for NE101 the second time I taught it in 2015. Andrew showed himself to be as skilled a teacher as he is a researcher, and he was extremely well-liked by all of the students in the class.

I have personally mentored more than 30 students, post-doctoral researchers and early-career staff scientists during my 23+ year career, and I’ve written hundred letters of recommendation. However, I can comfortably say that I have never met a young researcher who is such a “technical polyglot” as Andrew. Andrew’s undergraduate degree is in chemical engineering, but he seamlessly merged into the nuclear physics community. He is a skilled programmer and data analyst, and has demonstrated the kind of intellectual adaptability needed to flourish in a multi-disciplinary research team. Lastly, Andrew has an exceptionally well-developed degree of emotional intelligence and is able to work with people from a wide range of personal and cultural backgrounds. He is a consummate gentleman whose reputation for unselfishness and kindness are well-known to all of his fellow graduate students in the nuclear engineering department. In short, I believe that he is an ideally-suited candidate for the Schmidt Science Fellowship to pursue interdisciplinary work on the cusp between nuclear science/engineering and biomedical applications. Please do not hesitate to contact me if you have any questions regarding him.



Lee Bernstein

Nuclear Data Group Leader

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1. Beam-induced back-streaming electron suppression analysis for an accelerator type neutron generator designed for 40Ar/39Ar geochronology. Cory Waltz, Mauricio Ayllon, Tim Becker, Lee Bernstein, Ka-Ngo Leung, Leo Kirsch, Paul Renne, Karl Van Bibber. Applied Radiation and Isotopes, Volume 125, Pages 124–128 (July 2017). **doi**: [10.1140/epja/i2017-12253-2](http://dx.doi.org/10.1140/epja/i2017-12253-2)  [↑](#footnote-ref-1)
2. <http://bang.berkeley.edu/events/ndnca> [↑](#footnote-ref-2)
3. “Measurement of the 64Zn,47Ti(n,p) Cross Sections using a DD Neutron Generator for Medical Isotope Studies”. A.S. Voyles *et al.*, Nuclear Instruments and Methods in Physics Research B 410 (2017) 230–239. <http://dx.doi.org/10.1016/j.nimb.2017.08.021> [↑](#footnote-ref-3)
4. <http://tid.uio.no/workshop2017/talks/OsloWS17_Voyles.pdf> [↑](#footnote-ref-4)