

**PROMOTION RECOMMENDATION**

The University of Michigan  
College of Engineering

Zhong He, associate professor of nuclear engineering and radiological sciences, with tenure, Department of Nuclear Engineering and Radiological Sciences, is recommended for promotion to professor of nuclear engineering and radiological sciences, with tenure, Department of Nuclear Engineering and Radiological Sciences, College of Engineering.

Academic Degrees:

Ph.D. 1993 Southampton University, Physics, United Kingdom  
M.S. 1989 High-Energy Physics Institute, Beijing, P.R. China  
B.S. 1986 Tsinghua University, Department of Physics, Beijing, P.R. China

Professional Record:

2004-present Associate Professor (with tenure), Department of Nuclear Engineering and Radiological Sciences, University of Michigan  
1998-2004 Assistant Professor, Department of Nuclear Engineering and Radiological Sciences, University of Michigan  
1995-1998 Assistant Research Scientist, Department of Nuclear Engineering and Radiological Sciences, University of Michigan  
1994-1995 Post Doctoral Research Fellow, Department of Nuclear Engineering and Radiological Sciences, University of Michigan  
1990-1991 Visiting Research Scientist, Service D'Astrophysique, CEN-Saclay, France  
1989-1989 Staff Member, High Energy Physics Institute, Academia Sinica, P.R. China

Summary of Evaluation:

Teaching: Professor He is an excellent classroom teacher as well as a productive and effective advisor of doctoral students. He has averaged 4.26 for Q1 and 4.36 for Q2 for the 14 courses he has taught since 2001, which included required undergraduate courses as well as advanced graduate courses. Indicative of the esteem that the students have for his teaching abilities, Professor He was twice selected by the students for the Outstanding Teacher Award during this period of time. Professor He has graduated eight Ph.D. students since 2001, and has another ten Ph.D. students under advisement. The dedication of Professor He to teaching, both in the classroom and in research mentorship to a large cohort of graduate students, is remarkable.

Research: Professor He is a nationally and internationally recognized researcher in the field of radiation detector development, sought after by government laboratories and agencies who want to take advantage of his breakthrough research for national security and homeland security applications. Professor He was the first to realize that the depth of the interaction in a detector could be inferred by careful interrogation of the signals, thus improving energy resolution but at the expense of more complex signal processing. Professor He has accumulated an impressive publication record, publishing in prestigious journals and cited regularly by others. Professor He has attracted a large number of grants in the last couple of years from external agencies with a good likelihood of long-term continuation. For 2007 alone, Professor He had nearly \$3M in external funding from his grants. These funds are used to support his cohort of doctoral students and his research enterprise, both of which are growing rapidly and show no sign of leveling off.

### Recent and Significant Publications:

- S.D. Kiff, Z. He and G. Tepper “Improving Spectroscopic Performance of a Coplanar-Anode High-Pressure Xenon Gamma-Ray Spectrometer,” *IEEE Transactions on Nuclear Science*, Vol. 54 (4), pp. 1263-1270, 2007.
- K. Hitomi, T. Onodera, T. Shoji and Z. He, “Pixellated TlBr Detectors with the Depth Sensing Technique,” *Nuclear Instruments and Methods in Physics Research A*, 578, pp. 235–238, 2007.
- F. Zhang, Z. He, C. E. Seifert, “A Prototype Three-Dimensional Position Sensitive CdZnTe Detector Array,” *IEEE Transactions on Nuclear Science*, Vol. 54 (4), pp. 843-848, 2007.
- D. Xu and Z. He, “Gamma-ray Energy-Imaging Integrated Spectral Deconvolution,” *Nuclear Instruments and Methods in Physics Research A*, 574, pp. 98-109, 2007.
- D. Xu and Z. He, “Filtered Back-Projection in 4- $\pi$  Compton imaging with a single 3D position sensitive CdZnTe Detector,” *IEEE Transactions on Nuclear Science*, Vol. 53 (5), pp. 2787-2795, 2006.
- L. J. Meng, Z. He, B. Alexander and J. Sandoval, “Spectroscopic Performance of Thick HgI<sub>2</sub> Detectors,” *IEEE Transactions on Nuclear Science*, Vol. 53, No. 3, pp. 1706-1712, 2006.
- F. Zhang and Z. He, “New readout electronics for 3-D position sensitive CdZnTe/HgI<sub>2</sub> detector arrays”, *IEEE Transactions on Nuclear Science*, Vol. 53 (5), pp. 3021-3027, 2006.
- S.D. Kiff, Z. He and G. Tepper, “Radial Position Sensing in a Coplanar-Grid High-Pressure Xenon Gamma-Ray Spectrometer,” *IEEE Transactions on Nuclear Science*, Vol. 53, No.3, pp. 1380–1384, 2006.
- B. W. Sturm, Z. He, T.H. Zurbuchen and P.L. Koehn, “Investigation of the Asymmetric Characteristics and Temperature Effects of CdZnTe Detectors,” *IEEE Transactions on Nuclear Science*, Vol. 52(5), pp. 2068-2075, 2005.
- Z. He and B. W. Sturm, “Characteristics of depth sensing coplanar grid CdZnTe detectors,” *Nuclear Instruments and Methods in Physics Research A*, 554, pp. 291-299, 2005.

Service: Professor He has been a willing and effective member of several department-level committees as well as the College of Engineering Curriculum Committee. He has served his profession as the Technical Program Chairman for the International Symposium on Radiation Measurements and Applications (2006) and as editor for the conference volume published by Elsevier. Professor He also serves as an elected member of IEEE’s Radiation Instrumentation Steering Committee, a member of a NASA review panel, and as a scientific program reviewer for DOE’s NNSA.

### External Reviewers:

Reviewer A: “In brief, Dr. He is an outstanding leader and innovator in the field. His work, for example on 3D detectors, is ground-breaking and important to the whole development of semiconductor detectors for gamma rays.”

Reviewer B: “The quality of Prof. He’s work is very high; the scientific and technological problems related to his research activity, as the 3D-position sensing of gamma radiation interaction within the semiconductor detectors, are relevant.”

Reviewer C: “... relatively speaking he is one of the top leading scientists in this field. Probably top 5% or higher if I have to say a number.”

Reviewer D: “... where he has marked himself as the foremost leader in the field of semiconductor readout technology. ... Zhong He’s brilliant solution to this problem takes advantage of these dependencies and results in a unique detector that provides both high-resolution gamma-ray spectra and position information. ... In the past ten years he has come to be the leader in this field, as evidenced by his publication record and grant activity.”

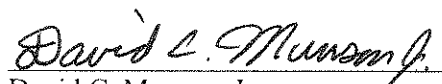
Reviewer E: "... and have been continually impressed by his solid work and steady rise to become, now, one of the leading experts on imaging CdZnTe (and related) gamma-ray detectors. ... and he is now clearly in the lead on development of 3D imaging detectors that are of considerable interest to a range of applications (notably, Homeland Security). ... The range of projects and interesting results presented by Zhong's students and postdocs were truly impressive. This tells me he obviously does merit promotion as a professor; he clearly teaches and inspires his students. ... is becoming known as leading the field of Compton imagers..."

Reviewer F: "Dr. He has been a pioneer and eminent leader in the development of radiation sensor technology for high-resolution X-ray and gamma spectroscopy. ... He played a leadership role in the development of lightweight, 3-D position-sensitive gamma-ray detectors for safeguarding applications. He was the first person to report gamma-ray energy spectra using two scattering events. ... His research on detector development and integration of the devices into instruments has had a major impact in the fields of gamma-ray spectrometers, astrophysics, national security, and high-resolution imaging for medical uses, and his creative ideas have been felt by a large number of industrial, academic and government research institutions."

Reviewer G: "Zhong's work in the area of solid state radiation detection, particularly with CZT, has been outstanding and he is rightly known world wide for this. He has simply done things with CZT and CZT imagers which were deemed either impossible or highly difficult. ... Zhong's work is at the leading edge of this work. ... His work covers both areas and is significant because a deep knowledge of both the material characteristics and the state of the art in electronics must be brought together to produce significant advances as he has done."

Reviewer H: "In balance, Dr. He is known as one of the leading experts in the radiation detection technical community. ... In my estimation Dr. He would be ranked near the very top of his peer group. There are perhaps twenty or so researchers with equivalent experience and in similar positions in academic Nuclear Engineering and Physics departments throughout the U.S. Dr. He would definitely be considered to be one of the top three in this group."

Summary of Recommendation: Professor He is a highly-regarded scientist who has become a national and international leader in the development of 3D position sensitive radiation detectors. Professor He is an accomplished teacher, garnering excellent student evaluations over a sustained period of time, and is a productive and effective doctoral advisor. He also participates on department and college committees and serves his profession well. It is with the support of the College of Engineering Executive Committee that I recommend Zhong He for promotion to professor of nuclear engineering and radiological sciences, with tenure, Department of Nuclear Engineering and Radiological Sciences, College of Engineering.

  
David C. Munson, Jr.  
Robert J. Vlasic Dean of Engineering  
College of Engineering

May 2008