Combined Training in Diagnostic Radiology and Nuclear Medicine: The Stanford Experience

Andrei Iagaru, MD

January 23rd, 2015
History of the Stanford NM Program

- Established: 1973
- Original ACGME accreditation: May 21, 1975
- Number of graduates to date: 59
- ABNM passing rate on 1st attempt (last 10 years): 93.3%
- 4 approved positions, 3 funded
- 2013 graduates:
  - Judy Nguyen: Attending Physician at Kaiser Permanente Northern California
  - Guido Davidzon: Assistant Professor at Loyola University
- Previous program directors
  - Ross McDougall (1986 – 2008)
  - Sanjiv Sam Gambhir (2008 – 2010)
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<tr>
<th>Name</th>
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<td>Andrei Iagaru, MD</td>
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<td>Erik S Mittra, MD, PhD</td>
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<td>Henry Guo, MD, PhD</td>
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<td>Andrew Quon, MD</td>
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<td>Fred Chin, PhD</td>
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<td>George Segall, MD</td>
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<td>Craig Levin, PhD</td>
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<td>Minal Vasanawala, MD</td>
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<td>I. Ross McDougall, MD, PhD</td>
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<td>Joseph Wu, MD, PhD</td>
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NM Residency Training in the US

Number of Programs and Filled Positions by Academic Year

- Programs
- Filled Positions
History of the ABNM

- The American Board of Nuclear Medicine (ABNM) was the first conjoint board established under provisions of the "Essentials for Approval of Examining Boards in Medical Specialties" of the American Board of Medical Specialties.
- ABNM was sponsored by the American Board of Internal Medicine, the American Board of Pathology, the American Board of Radiology, and the Society of Nuclear Medicine (approved on June 19, 1971).
- In 1985, with the support of the original sponsors, ABNM became a primary certifying Board.
- The ABNM is an independent, non-profit organization, one of 24 medical specialty boards that make up the American Board of Medical Specialties (ABMS).
- ABNM has certified 5,215 individuals from 1972 to 2009.
The Janus Project: The Remaking of Nuclear Medicine and Radiology

Steven M. Larson

Nuclear Medicine Service, Memorial Sloan-Kettering Cancer Center, New York, New York

- Janus is the god of beginnings and transitions
- In the early days of NM, there was a sense of broader medical orientation, knowledge of the tracer principle, and interest in physiology, function, and research
- Others were quick to note the deficiencies in the quality of NM images - “unclear medicine” was a common phrase
- Currently there is a totally transformed picture, with better technology enabling high quality nuclear medicine and molecular imaging studies combined with anatomy from CT and MRI from scanners such as SPECT/CT, PET/CT and PET/MRI
With some justification, radiologists will say that nuclear medicine training is insufficient for the best understanding of modern cross-sectional imaging.

The nuclear medicine community will respond that the private practice of NM in the United States is largely in the hands of radiologists with an average of 4 months of training in the specialty.

Neither situation of training seems adequate for the demands of modern practice, and both specialties should go on record as supporting more complete training in these important areas.

At present, neither radiology nor nuclear medicine training provides optimal preparation for a career of research excellence.
## Combined ABNM–ABR Training Program in Molecular Imaging

<table>
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<th>Recommendation</th>
<th>Description</th>
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<td><strong>Radiology training</strong></td>
<td>2.5 y of training with emphasis on CT and MRI, including standard rotations in interventional radiology, emergency radiology, and neurology (under auspices of ABR)</td>
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<td><strong>Nuclear medicine training</strong></td>
<td>16 mo of training in basic nuclear medicine and 2 mo in molecular imaging (under auspices of ABNM)</td>
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<td><strong>Additional training</strong></td>
<td>At end of 4 y of training, although eligible for ABR and ABNM certification, trainee is encouraged to take 1- to 2-y fellowship training in molecular imaging</td>
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<td><strong>Molecular imaging fellowships</strong></td>
<td>Specialized molecular imaging core curriculum, weekly lectures on advanced imaging and probe development, relevant biology in cancer and other target tissues</td>
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<td><strong>Dual-mentor–supervised research program in molecular imaging</strong></td>
<td>Basic science mentor from disciplines of biochemistry, pharmacology, immunology, cell biology, molecular biology, genetics</td>
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<td>Molecular imaging mentor with emphasis on radiochemistry, cancer pharmacology, tumor immunology, gene therapy, imaging physics</td>
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<td><strong>Practica in technical aspects of molecular imaging such as small-animal imaging, vector development, and radiolabeling</strong></td>
<td>Access to core curriculum of parent university MD–PhD program in cell biology, pharmacology, animal handling, research ethics, statistics</td>
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<td><strong>Weekly institutional lecture series, including molecular imaging series with outside experts, cancer biology, and translational cancer biology</strong></td>
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The ABR Pathway

- 16-month residency pathway to Nuclear Radiology subspecialty certification (within a 48-month diagnostic radiology residency)
- Ten of these months must be consecutive to preserve clinical care and learning continuity mimicking the experience of traditional fellowship pathways
- Up to two months of nuclear medicine training in the clinical year (PGY) may count toward the 16-month requirement, if obtained in an institution with an ACGME-accredited diagnostic radiology residency and with an ACGME-accredited nuclear radiology fellowship or ACGME-accredited nuclear medicine residency
- The sponsoring diagnostic radiology residency program must be in an institution with either an ACGME-accredited nuclear radiology fellowship or an ACGME-accredited nuclear medicine residency program
- The program must fulfill the ABR requirements for NRC training and experience, leading to an authorized user (AU)-eligible diagnostic radiology certificate
“More is better!”

NM or DR?

“And is better!”
# NM/DR at Stanford

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<tr>
<th>PGY</th>
<th>Program</th>
<th>Duration</th>
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<tr>
<td>1</td>
<td>Internal Medicine or Surgery</td>
<td>12 months</td>
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<tr>
<td>2</td>
<td>Nuclear Medicine and Research</td>
<td>12 months</td>
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<tr>
<td>3</td>
<td>Diagnostic Radiology (including 1 month NM)</td>
<td>12 months</td>
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<tr>
<td>4</td>
<td>Diagnostic Radiology (including 1 month NM)</td>
<td>12 months</td>
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<tr>
<td>5</td>
<td>Diagnostic Radiology (including 1 month NM)</td>
<td>12 months</td>
</tr>
<tr>
<td>6</td>
<td>Diagnostic Radiology (NM fellowship and Research)</td>
<td>12 months</td>
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Exploring the possibilities: 2008-2010

Stanford GME office in Jan 2010

- Ann Dohn: full support
- Hospital GME committee: full support

Letters to the ABR and ABNM in Jan 2010

- ABR: denied
- ABNM: full support
Letters to the ABR and ABNM in Sep 2011
  ✓ ABR: denied
  ✓ ABNM: full support

Letters to the ABR and ABNM in Sep 2012
  ✓ ABR: denied
  ✓ ABNM: full support
Meeting with ABR board of directors at RSNA 2012

Letters to the ABR and ABNM in Jun 2013

- ABR: accept
- ABNM: full support
Letter to ACGME in Sep 2013
  ✓ Combined training in DR and NM: accept
  ✓ ADS number issued

Communication with NRMP in Sep 2013
  ✓ Active in the residency match 2014

Communication with ERAS in Sep 2013
  ✓ Missed the deadline for the residency match 2014
Rules for the selection of 1 resident each year:

- **DR program representation:** Terry Desser, Peter Poullos, Michael Federle, Sandip Biswal
- **NM program representation:** Andrei Iagaru, Erik Mittra, Andrew Quon, George Segall
- Participate in the residency match
- Same interview selection criteria as for the DR candidates
- Attempt to recruit candidates with a strong background in molecular imaging and clinical translational research, in addition to a proven record of DR interest
July 2015

- 1 DR resident transferring in the NM/DR pathway as PGY3
- 1 NM resident transferring in the NM pathway as PGY3

Match 2015:

- Interviewed 6 candidates together with DR faculty
- 4 candidates have prior extensive research in Nuclear Medicine
- Hopeful for a successful selection process
Challenges

- Get support from local institution GME office (complicated financial arrangements that may not work for all institutions)
- NM RRC will issue citations as residents will leave NM program after 1 year (local GME DIO: “we’ll deal with it”)
- “75% passing ABNM certification exam within 3 years of graduation”
- Candidates who see this as a back door to the DR program
- Making sure trainee will return to NM for year 5 of the dual training and not chose another mini-felloship
Acknowledgements

Sanjiv Sam Gambhir, MD, PhD

Ross McDougall, MD, PhD

George Segall, MD

Sofia Gonzalez

Terry Desser, MD

Peter Poullos, MD

Henry Royal, MD

Ann Dohn, DIO
Thank You!