

mere analogizing, is the casting of discussions in terms of measurables and mathematics, so that statements can be tested by laboratory or computer experiments. The "criticality" of the nervous system discussed by Christopher J. A. Game in his referenced publications is not described in such terms.

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Medical Physics Jobs: What's the Prognosis?

Medical physics can be one of the most challenging and rewarding applications of physics in society today (as evidenced, for example, by Arthur Robinson's Career Choices column in *PHYSICS TODAY*, September 1993, page 47). The American Association of Physicists in Medicine, the largest professional organization of medical physicists, has over 3500 members worldwide. The majority of AAPM members practice in the United States. Unlike what we are seeing in other physics fields, there is still a shortage of medical physicists in North America, and this should remain the case at least into the near future. Below is an analysis of current employment prospects to provide useful information for anyone contemplating a medical physics career.

The medical physics profession is split into six major subspecialties: radiation therapy physics, diagnostic imaging physics, magnetic resonance imaging physics, radiation safety and health physics, nuclear medicine physics, and other applications of physics in medicine, for example, hyperthermia and photodynamic therapy. A career in any one of these specialties can be very fulfilling and will most likely offer a relatively high salary at this time. I myself have recently finished my PhD in medical physics at the University of Wisconsin and currently enjoy work in a hospital-based radiation therapy clinic as a clinical physicist.

Ideally one's own interest would be the most important driving force in choosing a specialty; however, more mundane factors should also be considered, such as the probability of finding a job quickly after finishing one's studies. This probability varies with specialty. The report of the most recent AAPM professional information survey¹ (data for 1993) shows that 68% of respondents claimed radiation therapy to be their primary involvement, 13% claimed diagnostic imaging, 4% magnetic resonance imaging, 7% radiation safety and 4% nuclear medicine; 4% were employed in

other categories. (Approximately three-quarters of the 2500 eligible medical physicists responded to the survey. The remaining 1000 members of the AAPM were either student, emeritus or charter members and were not included.) This survey alone may not give an accurate indication of hiring trends. If, for example, all available positions in a specialty were already filled, a high employment proportion in that specialty would incorrectly imply many employment opportunities. Similarly, a low employment proportion in any one specialty could be the result of there being either many vacancies or not many positions to begin with. To gain a better understanding of medical physics employment opportunities, it is therefore useful to analyze hiring trends over the past several years.

The AAPM operates a placement service for its members and every month publishes and distributes the "blue book," which lists vacant medical physics positions worldwide. Over the past three years² a total of 979 jobs were advertised. Most jobs were listed only once, with a high proportion being newly created positions. It is encouraging to see the high number of vacant positions posted monthly, although the average number of posts per month has decreased from a high of 34 in 1992 to only 20 in 1994, suggesting that the medical physics field is slowly saturating. Not surprisingly, radiation therapy physics represented the largest fraction, with well over half of all posted jobs in the past three years being in this specialty. Approximately 12% of all jobs were in diagnostic imaging, while the remaining groups each made up less than 10% of the total. The similarity of these figures to the employment breakdown described above suggests that the need for physicists in each subgroup remains constant.

References

1. *Professional Information Survey Report*, Am. Assoc. of Physicists in Medicine, New York (1993).
2. *AAPM Placement Service Bulletin*, Am. Assoc. of Physicists in Medicine, New York (January 1992 to December 1994).

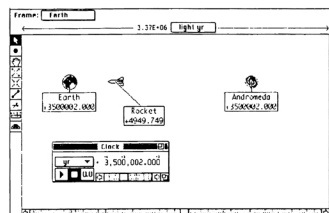
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The Persian Pursuit of Physics

I recently went to Iran to attend the meeting of the Physical Society of Iran, which took place at the University of Kurdistan, in Kurdistan province, from 25 to 29 August. This annual conference, held in a different

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part of Iran each year, brings together physicists and astronomers to present their research results. The Physics Society of Iran had invited me, along with a few other Iranian-born physicists and astronomers who live in the US and Europe, to give several specialized and general talks.

I had many reservations about attending the conference. First of all, I had not visited Iran since leaving 18 years ago. In the meantime a revolution had occurred, and I had had no contact with any Iranian physicists or astronomers. I was also very concerned about translating into Farsi the astronomical jargon that even English-speaking physicists have a hard time following.

The meeting took place in a big auditorium that held the few hundred participants. Of these, a good fraction were women, who wore traditional black Islamic dress and who sat on one side of the auditorium, separated from the men. Most of the women were faculty members or physics students at various universities throughout Iran. After introducing myself to Iranian colleagues, I learned that I was not supposed to shake hands with women colleagues in public, although it was acceptable for married men and women to hold hands when walking in the streets of Tehran.

Much of the first few hours of the meeting was devoted to political issues that surround the physics community in Iran—in particular, issues relating to math and physics students as well as to budgets. Iran is producing a number of very good math and physics students. Only 10% of secondary school students are accepted to attend public universities. Last year, 20 out of the top 100 students in all fields chose physics as their first choice for a field of study. This is an unprecedented event in the history of physics departments in Iran, since top students have generally chosen engineering. On the international level, Iranian students are winning medals in the physics and math olympiads. In 1994 Iranian students earned fifth place in the physics olympiad and they won two gold, two silver and two bronze medals in the math olympiad. Iranian students were unfortunately not able to participate in the 1993 physics olympiad, held in the US, owing to difficulties obtaining visas. [See the letter from Taraneh Shimi in PHYSICS TODAY, December, page 85.]

A heated discussion between the Iranian Minister of Science and the president of the physics society centered on how the small science budget is affecting the quality of science in Iran and how it affects the country's retention of

physics students. Currently 0.4% of the GNP is spent on R&D, up from 0.2% in 1989. Apparently, a number of excellent students have left Iran to pursue their physics studies at foreign universities. Many of these students apply to universities in the US despite the fact that they must go to Turkey to take the GREs and the lack of formal diplomatic relations between Iran and the US. The latter has made the acquisition of visas quite difficult. To stem this drain of talented students, the Ministry of Culture and Higher Education has recently established an Institute for Advanced Studies in Basic Sciences in Zanjan, which is about 30 km northwest of Tehran. Inspired by the International Centre for Theoretical Physics in Trieste, this institute has been admitting students since February 1993 to pursue master's or PhD degrees in theoretical physics, astrophysics, relativity, and quantum optics and dynamical systems. A prerequisite for obtaining a PhD is to publish two papers in international physics journals. Experimental programs in radio astronomy have been started by building a radio interferometer with dishes of about 4 meters in diameter. There is also discussion about having an optical observatory center in Kerman, to be used nationally.

The meeting was quite similar in many respects to other scientific meetings that I have participated in. A bulletin of the abstracts for all of the talks and poster exhibitions, written in both English and Farsi, was distributed to every attendee. Invited talks in different branches of physics were given in the auditorium, and specialized short seminars were given in small rooms. All invited talks were videotaped, and all of the contributions were audiotaped for the University of Kurdistan's archives. The news media were represented by TV, radio and print reporters—including representatives of the Iranian counterparts to PHYSICS TODAY and *Sky and Telescope*—interviewing scientists. (I was told that *Nojoom* is the only monthly astronomical magazine published in the Middle East.) There was particular interest in gathering information about the collision of Comet Shoemaker-Levy with Jupiter.

After giving a few specialized talks on astronomy, I gave my invited talk on the last morning of the conference. My Farsi had improved enough for me to translate most of the astronomical jargon in my talk. Afterwards I found myself surrounded by mobs of students who showed an incredible curiosity about astronomy in the US. Some complained about the lack of astrophysics courses in Iranian universi-

ties, while others complained about the difficulty in getting access to journals. (In fact, two students asked me to mail them a paper published in *Nature* circa the 1960s.) The persistence and enthusiasm of the students to learn something new were so great that I had to give another seminar later in the afternoon.

I hope that through my description of the physics conference I have given a glimpse of the scientific atmosphere in Iran and have conveyed the impression that even with limited resources, the scientific conference held in Iran is not very different from those held in Western nations.

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Referees: Refuse Requests Rapidly

I suggest that there is a *first obligation of a referee*, easily satisfied but too often ignored. When a paper arrives on your desk for review and you glance at it (which you always do with incoming mail anyway), decide, then and there, whether you will referee it. If you don't care to, just write on the editor's letter of transmittal, "Sorry, no time now," and dispatch it in the outgoing mail. It is not acceptable to render a "sorry" decision 6 or 8 or 12 weeks later. Young people's careers can be at stake, as well as their credits for new discoveries. To hold a paper for months is not just unacceptable. It is unethical.

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