

Fermilab
FY2002 Self-assessment
Process Assessment Report
For
Division/Section ___Particle Physics Division___
Date ___September 24, 2002_____

Division/Section performing assessment

Particle Physics Division (PPD)

Name of organization that owns assessed process

PPD Theoretical Astrophysics Group (TAG)

Organization Strategy

Research Associates contribute significantly to the scientific output of the TAG

Names of Personnel on Assessment team

Scott Dodelson, Liz Duty

Name of process assessed

Astrophysics Research Associate Hiring

Brief description of process to be assessed

All aspects of the hiring process, from advertisements to productivity to follow-up after departure.

The Theoretical Astrophysics Group has funding for four research associates, positions that typically last for 2-3 years. In addition, the group offers the David N. Schramm Fellowship, also a term position, but meant to be more prestigious, with a term up to five years. Typically, then, two or three positions open up in a given year, with the research associates moving on to similar positions at universities or moving up to faculty positions. Success in this regard is very clear: a successful research associate will eventually obtain a faculty position in astrophysics.

Timing is one of the biggest issues in the process. Advertisements must be placed by the end of August so that they appear in Physics Today's October and November issues. Application deadlines vary from institution to institution, so one important choice facing us is this deadline. In recent years, we have moved up the deadline to compete with top groups in the United States and Canada. It is currently December 1. Our offers go out over the ensuing two to three months. One concern is that we often do not know for sure whether our current research associates will obtain new positions. This is a particularly difficult problem for our more senior research associates, who apply for faculty jobs. The decisions on these faculty hires can extend into May.

The hiring process itself starts with a group meeting, in which we identify a long "short list," typically of about twenty people. Of these, we invite three candidates to give job talks in early January. This decision is usually fairly straightforward since overseas candidates cannot be invited, and we often know personally many of the best researchers.

We have no firm policy of when to make offers. We have made some as early as mid-December and others in late-February. The most difficult decision for us after we decide on a candidate is to set a deadline for acceptance. There is no universally accepted deadline. Many institutions require answers very early, and we have even heard of one which does not make a formal offer until it is sure to be accepted. There are efforts by various organizations to require institutions to allow job seekers to wait until February 15 to collect all their offers and then make an informed decision. In principle, we support this effort to make the lives of young scientists less stressful, and, if pressed, will usually agree to the February 15 deadline. However, given the practices of many of our competitors, we often try to set earlier deadlines.

An important issue for the Theoretical Astrophysics Group at present is the competition. When the group was founded in 1983, there were very few other groups, and certainly none as large, working in the field of particle astrophysics. Today cosmology is perhaps the hottest field in all of physics. Startling new discoveries are made on a yearly basis; exotic theories of the early universe have been tested; astronomical data, from galaxy surveys and cosmic microwave background experiments, is arriving at a blistering pace; and there are many indications that an understanding of the cosmos requires profound alterations in our understanding of fundamental physics. All of this activity has attracted the public's attention and as a result led to increased funding in the field. Universities have been struggling to build up their cosmology groups. Last year one of our former research associates was told by one university that there were thirty five applicants against whom he was competing for a faculty position. This number was two fewer than the numbers of cosmology jobs for which he applied! There may well have been more faculty jobs than applicants in cosmology last year.

For us, this success is a double edged sword. On the one hand, we work in the field and are excited as everyone else at the progress in a branch of physics we helped invent. Also, the increased number of faculty jobs makes it easier for our research associates to obtain positions, and, as mentioned above, this is one of our major goals. On the other hand, all of the new faculty members working in cosmology have money with which to hire post-docs. We are no longer the only players in the field. Graduate students with several strong papers often get multiple offers. To attract the best students, universities have begun extending the term of a typical post-doc, offering larger salaries than in the past, and/or naming the fellowships. For example, the most coveted student out of the University of Chicago last year, Asantha Cooray, received a five year offer from the Institute for Advanced Study in Princeton among many others. This, however, was topped by Caltech, which offered him a six-year position. This escalation is unprecedented in the field. Similarly, one of the students we supervised at the University of Chicago, Ryan Scranton, was offered two five year positions – at Penn and Pittsburgh – and one three year position at NYU.

1. Are metrics associated with this process? If so, what are they?

We use the following indicators to assess the process:

1. Advertising: Were ads placed in the right places at the right times? Pass if ads were placed in Physics Today and the American Astronomical Society's web page for the months of October and November.
2. Applications: Was the quality of applicants high enough? Did we attract the best applicants? Were there enough applicants? Pass if there were over 75 applicants and the best candidates known to us applied.
3. Offers and Acceptances: How many offers were made? How quickly after the application deadline? How many acceptances? How many rejections? This is the most important indicator, so we grade it on a scale of 1-5:
 - 1: no acceptances
 - 2: <25% of offers accepted, but all positions filled
 - 3: >25% of offers accepted
 - 4: >50% of offers accepted
 - 5: all offers accepted
4. Diversity: How many women applied? How many interviews went to women? How many offers? How many minorities applied? Were interviewed? Offered a position? Pass if we can determine these numbers.
5. "Next jobs" found by the people who leave these 2-5 year positions: Are our alumni finding further post-doc or faculty positions? Pass if at least one alumnus receives faculty offer. Fail if one of our post-docs receives no offers. Neutral otherwise

6. Every other year we can look at our pay scale relative to other institutions offering similar positions in theoretical astrophysics. Pass if our salary offers are within 95% of our leading competitors.

There are six indicators here. To give ourselves an overall score, we add all the points from each indicator. Pass equals one point, fail zero, except in indicator 5, where pass is 2 points, and neutral 1 point. From 1-5 points will be awarded for indicator 3. The total possible score then ranges from 1-11. The overall score is:

10-11: Outstanding
8-9: Excellent
5-7: Good
3-4: Marginal
1-2: Unsatisfactory

2. What are the names of the procedures associated with this process?

None

3. Are these procedures being followed? Are they current?

N/A

4. Describe the methodology used to assess this process.

We looked at all applications from 2001. To determine our success in the "Next jobs" category, we compiled the list of alumni in the Appendix. The information on pay scales and other features of competitors' jobs, we consulted professors at five universities.

5. Results of the assessment:

Indicator 1: Advertisements. We placed two ads in October/November issues of Physics Today and in similar months on the web site of the American Astronomical Society. (See Appendix B for copy of text.) The ads were smaller than the quarter page ones recommended by the Human Resources Department. We felt the smaller versions were more appropriate for this level. Indeed, almost every other post-doc ad was sized similarly.

Score: PASS

Indicator 2: Applicant Pool. We received a total of 88 applications for the one position available. These came from a broad geographic range. There are two issues here:

1. Completeness – are we getting all the best candidates to apply?

2. Efficiency – are too many of the applications from obviously unsuitable candidates?

To both of these questions, we give ourselves high marks. Since we know the market well, know the best candidates out there, we know whether they are applying to Fermilab. They are. There are inevitably a few dozen applicants who are obviously unsuitable for the position, either because they work in a different field or because of the clearly low quality of their work.

Score: PASS

Indicator 3: Diversity. We had very little data about the sexes and races of the candidates. Our best estimate is that 5 of the applicants were women. One of the interviewees was a woman, the rest male. It is difficult to gather information here since applicants typically do not disclose their race or sex.

Score: FAIL

Indicator 3: Offers. We made our first offer to James Bullock, a post-doc at Ohio State. We have known him since he was a graduate student at University of California at Santa Cruz. While initially distinguished as an expert on the very early universe, he has more recently made a name for himself with his work on large scale structure and the formation of galaxies. Our offer to Bullock was made early, in December. Our rationale was: he was certain to get many interesting offers, so to compete we would have a better chance if we struck early. The main risk in our early offer was that he would hold on to the offer, and then elect to go elsewhere. Fortunately, because we knew him so well, we were able to secure from him a promise to decide quickly and let us know as soon as possible. He ended up telling us at the beginning of January that he would not come to Fermilab.

Our second offer went out immediately to Christiano Porciani, a post-doc from Italy who has worked extensively on large scale structure. This offer did not go as smoothly. He assured us that we were his first choice, but his main issue was finding a job for his wife, a physician. He asked us to extend the initial deadline we gave him – the end of January – until the second week of February. Subsequently, he invoked the “universal” February 15 deadline and got a second extension. To attract him, we spent a significant amount of time learning the ins and outs of United States regulations concerning foreigners with medical degrees practicing medicine. This is not uncommon: we are frequently able to help spouses, and this help often bears fruit. In this case, it didn’t work. We couldn’t find a position for his wife, and he ended up accepting a position in Switzerland. When we met him this summer, he verified that we were his first choice, and his wife’s employment was the only thing which prevented him from accepting our offer.

One of the students we had invited to speak, Pengjie Zhang, impressed us a great deal and expressed a clear interest in our group. He was a student of Ue-Li Pen at the University of Toronto, working on clusters of galaxies. This is an interest shared by many in our group and in the experimental astrophysics group. His work, particularly in predicting the expected signal due to clusters in measurements of the anisotropies in the Cosmic Microwave Background, has received much attention. We maintained contact with him and told him about Porciani’s vacillations. In this way, we were able to convince him to put off accepting some other offers.

Finally, on February 17, Porciani officially declined, and we immediately extended an offer to Zhang. Within a week, he accepted.

Score: 3

Indicator 4: Next Jobs Obtained by Alumni. Three alumni from our group accepted faculty positions in FY2002. Zoltan Haiman accepted a job at Columbia University. Ravi Sheth left our group in mid-year for a position at the University of Pittsburgh. Lam Hui was lured away from a faculty position at Columbia to accept a position with our group. These three moves indicate the strength of our group. Not only are our alumni receiving jobs at unprecedented rates, but they are getting good jobs. Both Columbia and Pittsburgh are top-notch institutions, with very strong programs in astrophysics. Our ability to lure Hui away from Columbia is further indication of the prestige of our group.

Only one of our post-docs will be applying for jobs this coming year. Kev Abazajian has been very successful, writing four papers, arranging seminars, and organizing a big neutrino workshop scheduled for October. We are confident he will be able to find a position.

Score: PASS (2 points)

Indicator 5: Pay Scale. We obtained information about the packages offered to post-docs at seven competing institutions: Caltech, Pittsburgh/CMU, University of Pennsylvania, NYU, University of California at Davis, Princeton, and University of Chicago. The average salary at these institutions for an unnamed fellowship was about 3% lower than our most recent offer. Nonetheless, we want to be proactive about attracting the best people. A number of ideas have been proposed in this regard:

1. Raising salaries slightly.
2. Offering a fixed research budget of 5k. This might be more impressive than the unlimited amount we currently offer.
3. Naming more of our positions, perhaps even with a standard moniker: Enrico Fermi Astrophysics Fellows.
4. Offering more perks, e.g., laptops.
5. Highlight our excellent alumni placement record.

We are currently considering all of these options. Numbers two, three, and five are cost neutral, while 4 would require budget increase of 5k/year. Number 1 will not be proposed now (other than small increases to offset inflation), but may become necessary if our success rate drops.

Score: PASS

Summary and Evaluation: In FY2002, we received 88 applications for one position; made three offers, with two declining and the last accepting. The quality of the last candidate was high, certainly above threshold, but probably not as high as our top choice. Our alumni did remarkably well this year, with three obtaining new faculty jobs.

The postdocs working in our group were successful in FY2002. The one who will leave after two

years, Kev Abazajian, has done extremely well, and seems almost certain to get an excellent "next job."

Our overall assessment score was 8 out of 11, or Excellent.

Identified opportunities for improvement

The main area of improvement identified by us is in the packaging of the research associate positions. To make them more attractive to the best candidates, we identified five changes to the current package: increased salaries, fixed research budget, named position, laptop, and increased understanding of our successful history.

Schedule for implementation of improvements

For the next hire in roughly January, 2003, we plan to:

1. offer a fixed research budget of 6k
2. update our web page and recruiting pitches to highlight the success of our alumni
3. keep open the possibility of offering a laptop

We also will explore the possibility of naming the positions. Following FY2003, we plan to revisit the issues discussed here to see if it necessary to raise salaries further.

We plan to improve our monitoring of diversity by estimating the number of women applicants and recording the races of interviewees.

Status of improvements from previous assessment

Not Applicable

Attachments (supporting data, worksheets, reports, etc.)

Appendix A. Fermilab Theoretical Astrophysics Alumni
Appendix B. Current Ad in Physics Today Web Page

Appendix A

Fermilab Theoretical Astrophysics Alumni

<u>Name:</u>	<u>Present Position</u> <u>/Occupation:</u>	<u>Institution/Location:</u>	<u>Period at</u> <u>Fermilab:</u>
SCIENTISTS:			
Alex Szalay	Professor	Johns Hopkins University	09/84-- 09/85
Neil Turok	Professor	DAMTP, University of Cambridge	09/87-- 09/88
Andreas Albrecht	Professor	University of California, Davis	09/87-- 09/92
POSTDOCS:			
Keith A. Olive	Professor	University of Minnesota	07/83-- 08/85
David Seckel	Associate Professor	Bartol Research Institute	09/83-- 09/85
David Lindley	Author/Editor	Science/Nature/Science News	10/83-- 02/86
Lars G. Jensen	Associate Professor	North Dakota State University	09/84-- 08/86
Richard F. Holman	Professor	Carnegie-Mellon University	09/85-- 06/87
Jaime A. Stein-Schabes	Physicist	Shell Oil	09/85-- 09/88
David P. Bennett	Assistant Professor	Notre Dame University	09/86-- 08/88
Marcelo Gleiser	Professor	Dartmouth College	09/86-- 09/88
Albert Stebbins	Scientist II	Fermilab	11/86-- 11/88
Edmund J. Copeland	Reader	University of Sussex	09/87-- 09/89
Angela V. Olinto	Associate Professor	University of Chicago	09/87-- 09/90

Dongsu Ryu	Associate Professor	Chungnam National University, Korea	09/88-- 09/90
Ruth A. Gregory	Royal Society Fellow	University of Durham, England	09/88-- 10/91
David R. Haws	Computing	London	10/88-- 05/90
David Salopek	Senior Researcher	University of British Columbia	09/89-- 09/91
Ben-Ami Gradwohl	Managing Director	J. & W. Seligman & Co, New York	09/90-- 09/92
Esteban Roulet	Visiting Professor	Valencia, Spain	10/90-- 10/92
Fay Dowker	Lecturer	Queen Mary, University of London	10/90-- 10/93
Scott Dodelson	Scientist I	Fermilab	10/91-- 03/94
James Gelb	Assistant Professor	University of Texas, Arlington	12/91-- 03/93
Robert Caldwell	Assistant Professor	Dartmouth College	10/92-- 09/94
Stephane Colombi	Scientist	Institut d'Astrophysique, Paris	10/93-- 10/95
Igor Tkachev	Researcher	CERN	10/92-- 10/95
Andrew Heckler	Assistant Dean, College of Mathematical and Physical Sciences	Ohio State University	10/94-- 10/96
Yun Wang	Assistant Professor	University of Oklahoma	10/93-- 10/96
Istvan Szapudi	Assistant Professor	University of Hawaii	10/94-- 08/97
Antonio Riotto	Assistant Professor	Padova	11/95-- 09/97
Will Kinney	Postdoc	Columbia University	10/96-- 09/98
Chris Metzler	Postdoc	Harvard Smithsonian	10/95--

		Center for Astrophysics	09/98
Lam Hui	Scientist I	Fermilab	09/96-- 09/99
Andrew Sornborger	Researcher	Mount Sinai School of Medicine	10/97-- 08/99
Ewan Stewart	Assistant Professor	Korea Advanced Institute of Science & Technology	08/97-- 07/99
Zoltan Haiman	Assistant Professor	Columbia University	09/98-- 09/99
Pasquale Blasi	Faculty	Osservatorio Astrofisico di Arcetri	10/99-- 05/01
Michael Blanton	Research Scientist	New York University	11/99-- 07/01
Idit Zehavi	Research Scientist	University of Chicago	09/98-- 10/01
Ravi Sheth	Assistant Professor	University of Pittsburgh	10/99-- 12/01

Appendix B.

Current Ad in Physics Today Web Page

Return to AIP Home Page	<input type="text" value="Search"/>	Site Index
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 AIP Career services Home														
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Career Resources

POSTDOCTORAL POSITIONS
FERMILAB THEORETICAL ASTROPHYSICS GROUP
JOB CODE: 8397

Salary: Open
Location: Batavia, Illinois
Type: Full Time - Experienced

The Fermilab Theoretical Astrophysics Group expects to have several postdoctoral positions available beginning September 1, 2003. The group has a wide range of interests, including theories of the early Universe and their connection to particle physics, large-scale structure and evolution, dark matter and dark energy, ultra-high energy cosmic rays, neutrino astrophysics, and other topics in particle astrophysics. We are also heavily involved with the experimental astrophysics program at Fermilab, which includes the Sloan Digital Sky Survey, the Pierre Auger Project, and the Cryogenic Dark Matter Search. Currently, the staff members are Scott Dodelson, Joshua Frieman, Lam Hui, Edward Kolb, Albert Stebbins, and Michael Turner. There are five post-docs, including the David Schramm Fellow, John Beacom. The group works in close collaboration with the Particle Theory group at Fermilab and with the Department of Astronomy and Astrophysics at the University of Chicago. Interested applicants should, before December 1, 2002, send a curriculum vitae (including a brief statement of research interests), and arrange for three letters of recommendation to be sent to: Postdoc Search Committee, c/o John Beacom, Theoretical Astrophysics MS-209, Fermilab, P.O. Box 500, Batavia, IL 60510 USA. EOE/M/F/D/V. A U.S. Department of Energy Laboratory.

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