

DNP LRP Meeting on Education and Innovation

Wednesday, 6 August 2014

7:00 PM Welcome Reception - NSCL Atrium

Thursday, 7 August 2014

8:30 AM Breakfast

9:00 AM Plenary Session - NSCL Lecture Hall

Introduction and Overview

Remarks by DOE

Remarks by NSF

NSAC report on workforce development

Michael Thoennessen (MSU)

Jehanne Gillo (DOE)

Brad Keister (NSF)

Jolie Cizewski (Rutgers)

First official Town Meeting on Education and Application for a LRP

10:30 AM Break

10:45 AM Plenary Session - NSCL Lecture Hall

• Workforce Development

Analysis of workforce demographics

NNSA Workforce Development

The future MARS program at FIU

Educational aspects of the FRIB theory center

Workforce development in computational nuclear physics

Michael Thoennessen (MSU)

Sean Liddick (MSU)

Joerg Reinhold (FIU)

Filomena Nunes (MSU)

Richard Furnstahl (OSU)

74 total participants

Organizing committee:

Ed Hartouni (LLNL)

Anna Hayes (LANL)

Calvin Howell (Duke)

Cynthia Keppel (JLab)

Micha Kilburn (Notre Dame)

Amy McCausey (Michigan State, conf. coordinator)

Graham Peaslee (Hope College, co-convenor)

David Robertson (Missouri)

Gunther Roland (MIT)

Mike Snow (Indiana)

Michael Thoennessen (Michigan State, co-convenor)

12:00 PM Lunch

1:15 PM Education - NSCL Lecture Hall

• Graduate Education

2:30 PM Break

2:45 PM Education - NSCL Lecture Hall

• Undergraduate Education

4:00 PM Break

4:15 PM Education - NSCL Lecture Hall

• K12

5:30 PM Break

6:00 PM Dinner - NSCL Atrium

7:30 PM Parallel discussions on draft recommendations

Parallel Sessions

Innovation - 1221A/B

• Defense and Security

Innovation - 1221A/B

• Energy and Climate

Innovation - 1221A/B

• Health and Medicine

Friday, 8 August 2014

8:30 AM Breakfast

9:00 AM Education - NSCL Lecture Hall

• Public Outreach

10:15 AM Break

10:30 AM Plenary Session - NSCL Lecture Hall

Summary discussions of recommendations

12:00 PM Adjourn

Innovation - 1221A/B

• Innovation, Art and Forensic



Goals

Draft recommendations and write a white paper for the 2015 long range plan

SCHEDULE:

August/September:	3 town meetings focused on nuclear science
October 8 th :	Open discussion session at the DNP fall meeting in Hawaii
December:	White papers from town meetings are due
Jan-Mar 2015:	Resolution meeting
October 2015:	Report due at DOE/NSF



1983 NSAC Long Range Plan

A LONG RANGE PLAN FOR NUCLEAR SCIENCE

A Report by the
DOE/NSF Nuclear Science Advisory Committee

DECEMBER 1983



U. S. DEPARTMENT OF ENERGY
OFFICE OF ENERGY RESEARCH
DIVISION OF NUCLEAR PHYSICS



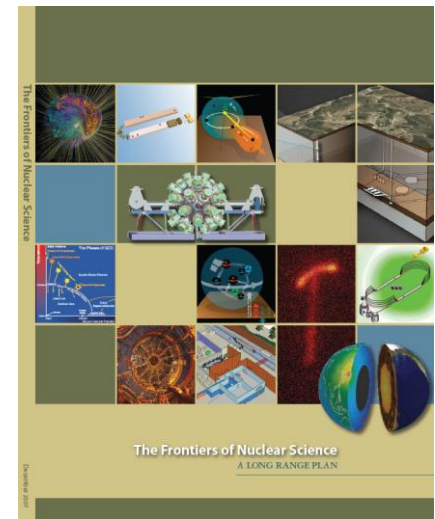
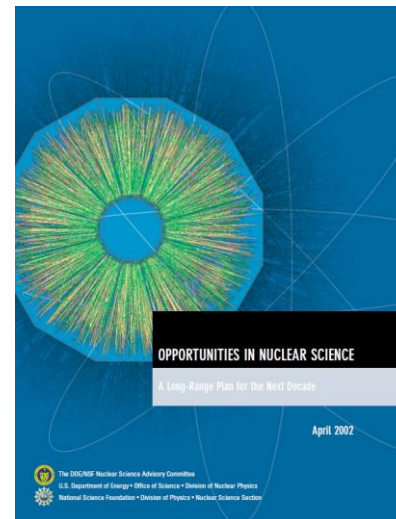
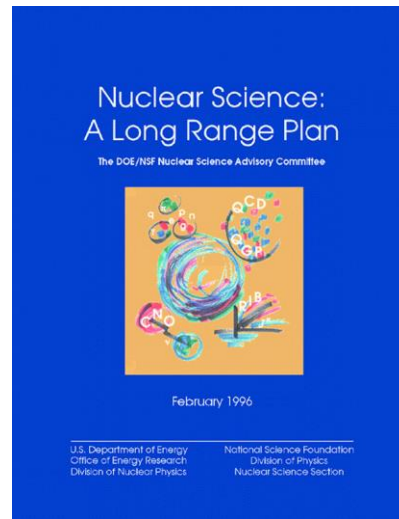
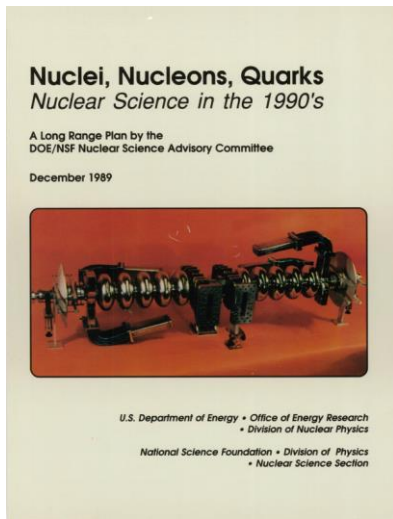
AND
NATIONAL SCIENCE FOUNDATION
DIVISION OF PHYSICS
NUCLEAR SCIENCE SECTION

It is becoming apparent that the rate at which nuclear scientists are being trained will not be adequate to meet the country's needs within the decade. Every year a large

Recommendations:

1. Efforts should be made to strengthen and expand programs which involve undergraduates in nuclear science research
2. Increase the number of competitive predoctoral fellowships at NSF and commit funds at DOE
3. Fund a competitive program of new research initiative by young nuclear scientists
4. Support technical staff for university groups
5. Educational aspects should be considered in decisions on new facilities

1989-1996-2002-2007 NSAC Long Range Plans



2007 LRP: The nuclear science community should endeavor to increase the number and diversity of students who pursue a graduate degree in nuclear science and to effect a change in the understanding of the field by the public, through:

- (1) the enhancement of existing programs and the inception of new ones that address the goals of increasing the visibility of nuclear science in undergraduate education and the involvement of undergraduates in research; and
- (2) the development and dissemination of materials and hands-on activities that demonstrate core nuclear science principles to a broad array of audiences.

Town meeting outline:

Three broad areas:

- Education (4 sessions)
- Applications (4 sessions)
- Workforce development (1 joint session)

Five questions to be addressed by presenters:

- What problem do you address or try to solve?
- What specifically is the role of nuclear physics?
- What are presently the biggest impediments?
- What resources do you require in the future?
- What is your overall vision to solve the issue in the future?

Thursday evening: Parallel discussion and drafting of recommendations

Friday morning: Joint summary session for discussion of recommendations



Overall recommendation 1

Education and mentoring of the next generation nuclear scientists as well as dissemination of research results to a broad audience is an integral part of research. The funding agencies must ensure that these essential aspects become the responsibility of all researchers.

Overall recommendation 2

Nuclear science is an active and vibrant field with wide applicability to many societal issues. It is critical for the future of the field that the whole community embrace and increase its promotion of nuclear science to students at all stages in their career as well as to the general public.

Overall recommendation 3

Nuclear Physics researchers have been innovative leaders in the full spectrum of activities that serve to educate nuclear scientists as well as other scientists and the general public in becoming informed of the importance of nuclear science. The researchers are encouraged to build on these strengths to address some of the challenges in educating an inclusive community of scientists as well as those on the path to future leadership in nuclear science.

Overall recommendation 4

The interface between basic research in nuclear physics and exciting innovations in applied nuclear science is a particularly vital component that attracts young students into the field. It is critical that federal funding agencies provide and coordinate funding opportunities for innovative ideas of potential future applications.

Specific recommendation: Diversity

The nuclear science community should establish strong relationships with institutions and professional organizations serving underrepresented groups in order to increase research opportunities in nuclear science and associated technologies for students and faculty from underrepresented groups.

Specific recommendation: K12 and Outreach

- **Workshops on communicating nuclear science to the public should be offered at DNP meetings to educate undergraduate, graduate students and postdocs in this important skill early in their career.**
- **Experiences of the wide range of different outreach activities and events for K12 students and teachers should be better communicated within the community. A sustained effort to maintain a website of shared resources could focus the activities and utilize limited resources most effectively.**

Specific recommendation: Undergraduate Education

- **We strongly encourage the agencies to continue funding of the CEU program. For long term stability, the program should be administered by DNP within a model similar to the DNCT.**
- **The community is very disappointed in the lack of funding in the 2015 budget for the NCSS and strongly encourages that funding be restored.**
- **Efforts to increase undergraduate level nuclear physics hands-on summer schools and/or labs should be supported.**
- **Opportunities for collaborations between faculty and students from primarily undergraduate institutions and groups at research institutions and should be facilitated.**

Specific recommendation: Graduate Education

- **Topical theory collaborations have proved to be a successful model for educating graduate students and postdocs in theory and should be continued to be strongly supported.**
- **New emerging trends in educational technology, in particular frameworks for online education, should be explored as a component to enhance graduate courses. (This also applies to advanced undergraduate courses).**

Specific recommendation: Workforce development

- **We support the recommendations of the recent NSAC subcommittee on workforce development.**
- **We endorse the establishment of the proposed FRIB theory center that will serve to educate and nurture the next generation of nuclear scientists.**
- **Because of the importance of workforce development in scientific computing, and with the opportunity it provides towards training the next generation of interdisciplinary scientists we endorse the recommendation of the Computational Nuclear Physics Meeting.**

Next steps

- Refine draft recommendations
- Solicit “one pager” on outreach activities
- Update workforce statistics and demographics
- Write white paper

Presentations are available at the town meeting website:

<http://meetings.nscl.msu.edu/Education-Innovation-2014/program.htm>



“One-pagers” on outreach activities

Physics of Atomic Nuclei @ Notre Dame

Organization: University of Notre Dame
Contact: JINA Outreach
(574) 631-5326
jinaout@nd.edu

Grade Level: High school
Funding: NSF

Physics of Atomic Nuclei @ Notre Dame (formerly PIXE-PAN) hosted 15 high school students from 9 different states in its 6th year. Over the course of the week, students were presented with lectures by faculty in nuclear physics and astrophysics, performed modern lab experiments in the state of the art Jordan Hall of Science, and presented their findings in a poster presentation to parents and members of the physics department. The students entered the program with a high interest in science, and nuclear astrophysics in particular, and their interest remained high after. However, gains were seen in their attitudes towards basic nuclear research, and an understanding of what a career in research entails.

“I am really much more interested in nuclear science in general now”
The average score on the knowledge test, which covered lecture material as well as experimental concepts, rose from 47% to 73% after the week-long program. The students also found the program immensely enjoyable.

“Learning with a group of peers interested in science the way I am was one of the best educational experiences I’ve had so far”



website: www.jinaweb.org/outreach/PAN_ND/

As a result from the 2006 workshop on “Vision for Education and Outreach in Nuclear Science” in preparation for the 2007 LRP, a collection of “one-pager” of outreach activities was assembled.

Many nuclear scientists are very active in a variety of outreach activities and we would like to highlight them again in a similar collection.

Template is available at:

<http://meetings.nscl.msu.edu/Education-Innovation-2014>

Please send your contributions to Peggy Norris:

PNorris@sanfordlab.org



National Science Foundation
Michigan State University

Summary

- Education and dissemination has to be an integral part of research
 - Nuclear science has to be promoted by the whole community
 - Innovative approaches to address some of the challenges should be fostered and appreciated
 - Development of future applications is critical
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- Recommendations and white paper are work in progress
- Continued input and feedback is highly encouraged
- More opportunities for discussion in the next session