

## **Report of CID Activities for academic year 2003-04.**

(written by John P. D'Angelo, April 2004, edited August 2004)

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#### **I. Introduction**

The purpose of this report is to record the activities associated with the Carnegie Initiative on The Doctorate (CID) for the Mathematics Department at UIUC during the academic year 2003-04. The department was involved in many activities directly related to the CID; we briefly describe them in this report. We provide a detailed description of the REGS program, a lengthy report on the winter convening meeting, and much additional information. We do not include the report provided by the Alumni Visiting Committee, but that is available from the Director of Graduate Studies.

#### **II. Current Status of the CID in mathematics at UIUC**

The academic year 2003-4 at UIUC included at least a dozen events closely connected to the CID. John D'Angelo served as coordinator of CID activities; other faculty involved in discussions included Joe Rosenblatt (Dept. Chair), Phil Griffith (Director of Graduate Studies), Doug West (Chair of Graduate Affairs Committee), and Robert Fossum. David Murphy did an excellent job as the graduate student representative.

The next major event will be the CID convening meeting held at the Carnegie Foundation July 10-13, 2004. Both D'Angelo and Fossum will represent UIUC. We have chosen Lucas Sabalka to be the new graduate student representative; David Murphy is graduating.

It would be desirable to enhance CID activities and broaden faculty participation here in mathematics at UIUC. As a whole the faculty has been too little engaged. We had one town meeting associated with the graduate program; the discussion was lively but has not yet resulted in tangible action. The department also needs to follow-up on the report of the Alumni Visiting Committee (AVC). The recommendations in their report could perhaps have generated more sustained discussion.

From the perspective of the partner departments in the CID, one major problem has surfaced. University of Chicago seems to have dropped out, as most of the faculty there saw little value in their participation. This development is worrisome for the CID, as no smaller elite department is now represented. For convenience we name the departments and their 1995 NRC rankings:

Chicago (5), Michigan (9), Stony Brook (20), Illinois (21), Ohio State (29), Duke (36), Southern California (44), Nebraska (86).

The effect of losing Chicago could undermine the final report. Worried about this, D'Angelo discussed the matter with David Eisenbud, Director of MSRI, and with people from the Carnegie Foundation. As a result (see III.14) MSRI will participate in the summer

convening meeting; their participation will help mitigate the effects of losing Chicago. Although MSRI does not have a graduate program, it is involved in several activities (summer research programs for graduate students, postdoctoral programs, etc.) that are germane to the discussion of the doctorate in mathematics. MSRI also provides some credibility.

### III. Specific Events from academic year 2003-04

1) 10-02-03. Judith Ramaley visit; Our department presented its VIGRE and CID activities to the NSF Program Director of Education and Human Resources. Graduate students and faculty participated in a discussion where each person revealed “defining moments” in choosing research mathematics as a career path.

2) 10-04-02. D’Angelo spoke about the CID as a panelist on “Trends in Mathematics” at Washington University’s sesquicentennial conference. (Panel moderated by Guido Weiss; other panelists were A. Coifman, R. Bryant, A. Bonami.)

3) 10-16-03 to 10-18-03. Alumni Visiting Committee. Dick Hain (Duke), Stuart Kurtz (Chicago), Jim Colliander (Toronto), and Judy Walker (Nebraska), all UIUC graduate alumni, visited the department and prepared a lengthy report. (Report available.)

Comment: The Department has yet to take full advantage of the insights provided by this report. The Executive Committee (EC) discussed the report in its meeting of December 2, 2003, and some of its members criticized aspects of the report. The Chair (Joe Rosenblatt) forwarded copies of the report to the Provost (Richard Herman), the Dean of the Graduate College (Richard Wheeler), and the Dean of the College of Liberal Arts and Sciences (Jesse Delia). The Chair also mentioned the report in a faculty meeting.

The Department Chair (Joe Rosenblatt) and the Director of Graduate Studies (Phil Griffith) met with Richard Wheeler (Dean of the Graduate College) and discussed the report and its implications for the Graduate Program in Mathematics.

The Department needs to consider the report more deeply and to find ways to implement some of its suggestions.

4) 10-25-03. D’Angelo served as a panelist at the AMS Committee on Education meeting in Washington DC. The panel’s topic was the CID. It was moderated by Roger Howe; the other panelists were Hyman Bass (Michigan) and John Ewing (AMS).

5) 11-6-03 to 11-07-03. George Walker visited UIUC. Walker, a physicist and former provost at IU, is leading the CID. There was a joint luncheon with other UI departments involved in CID: History, Educational psychology, and Neurosciences. Walker also met with Rosenblatt, David Murphy, D’Angelo and also separately with D’Angelo and Bradlow.

6) 12-16-03. Focus Group for Sloan Study by Barbara Lovitts: Making the implicit explicit. Berndt, West, Burkholder, Schupp, D’Angelo participated in a discussion with John Ory and Karen Carney. This discussion will be used in a study (funded by the Sloan Foundation) of the doctorate by sociologist and author Barbara Lovitts.

7) 12-17-03. The Math Department held its first departmental town meeting in at least 25 years. The discussion focused on hiring, but we agreed to discuss the graduate program in a future meeting.

8) December 03. The GAC began discussions of a transition course for beginning graduate students. This topic could lead in interesting directions. Such a course would fill gaps, but could also serve as a recruiting tool if we allowed advanced undergraduates to enroll.

9) 01-07-04. Fossum, Rosenblatt, and Murphy convened with CID at AMS meeting in Phoenix. A lengthy report appears below.

10) 2-25-04. The second departmental town meeting spent 90 minutes on the graduate program. Although the discussion was lively, there was no tangible outcome. One piece of wonderful news was that former graduate Barry Greenstein donated \$100,000 to the department. A large chunk of this will be used for the summer research experiences for graduate students (REGS) program, to augment VIGRE funds.

Comment: REGS are an important development at UIUC; their existence came about through our participation in the CID. We include a report on REGS for 2003 in this document.

11) 2-26-04. A one hour Conference Call was held with Walker, Murphy, D'Angelo on CID. (see the section below on concerns of the Carnegie Foundation).

12) 2-27-04. GAC meeting devoted to CID progress. D'Angelo reported on CID activity but the level of engagement was not high.

13) 3-17-04. D'Angelo and Eisenbud met and discussed on how to get MSRI and CID together. As a result MSRI will participate in the convening meeting this summer.

14) 4-21-04. The annual meeting for the Graduate College at UIUC included a panel discussion on the CID. John D'Angelo represented Mathematics, Clare Crowston represented History, Michelle Perry represented Educational Psychology, and Sam Beshers represented Neurosciences. Each person described the departmental CID activities during the academic year 03-04. D'Angelo also discussed the influential Flexner report on Medical Education from 1910 (commissioned by the Carnegie Foundation) and he asked whether the CID could have a similar impact.

15) 07-10-04 to 07-13-04 CID convening at Carnegie Foundation in Menlo Park, CA.

16) 07-06-04 and 07-20-04 John D'Angelo and Michael Loui (Former Dean of the Graduate College, Carnegie Scholar, and Professor in ECE) held lengthy discussions about the role of the CID at UIUC. Loui presented some wonderful ways in which ECE involves its alumni, including for example various alumni awards as well as giving alumni the opportunity to vote for faculty teaching awards.

17) The Research Experience for Graduate Students program (REGS) continued for graduate students in summer 2004.

18) 08-11-04 John D'Angelo and Phil Griffith met with the UIUC Graduate College and representative of other units to discuss the preparation of a grant (funded by Ford Foundation and Pfizer) to study attrition rates in PhD programs. We asked many questions about the data base used by the Graduate College.

## IV. REGS 2003

REGS stands for “Research Experiences of Graduate Students”. Its purpose is to encourage research activities at an early stage of the graduate program. The REGS program for Summer 2003 was conceived by the Graduate Affairs Committee in 2002-3 as part of CID discussions. It consisted of twenty-one first and second year graduate students who worked on research projects with faculty in various formats. The norm was one or two graduate students working with one or two faculty. Twelve of these students were domestic and were supported by NSF special funding at \$3,200 each. The remaining students were supported at the same level by other funding sources. Not all projects culminated in a publishable research article. The primary goal of REGS is to engage (mathematically) younger graduate students in the research agenda of the Mathematics Department and to thereby increase their maturity level; such students are then prepared to participate in deeper research projects.

We list the graduate students who participated, with the faculty mentor in parentheses. We mention those who received NSF funding; some of the international students were supported by other sources.

### List of REGS Participants

James Atkinson (Ahlgren) NSF  
Timothy Kilbourn (Ahlgren) NSF  
Tamas Forgacs (D’Angelo) NSF  
Kevin Jones (Grayson)  
Youngsoo Kim (Grayson)  
Andrea Mhooon (Grayson) NSF  
Rekka Santhanam (Grayson)  
Barry Walker (Grayson)  
Chadwick Gugg (Ford and Zaharescu) NSF  
Andrew Ledoan (Ford and Zaharescu) NSF  
Bart Snapp (Dutta) NSF  
Caleb Eckhardt (Henson) NSF  
Jonathan Webster (Stein) NSF  
Samuel Kudziela (Duursma) NSF  
Ricardo Rojas (Duursma) NSF  
Christopher Lee (Lerman) NSF

### Related informal supported research activity

Ayham Gunaydin (van den Dries)  
Maciej Malicki (Solecki)  
Salih Azgin (Pillay)  
Shivi Bonsal (Junge)  
Jung Jin Lee (Junge)

We describe three of the REGS in more detail.

Professor Dan Grayson led a group of five graduate students from his course on algebraic K- theory into a Summer REGS project. Grayson is writing a graduate text on

the subject and wished to give a more manageable presentation of a particularly thorny topic. He divided up the workload among the students and served as their mentor. The end result was an article accepted for publication in *Journal of Algebra* jointly written by the five students and Grayson.

Professor Scott Ahlgren worked with two students on separate projects in number theory. Each student wrote up his own results at the end of summer. One has been accepted for publication in *Journal of Number Theory*. Both projects were successful in that they helped their respective student researchers achieve a higher level of confidence and understanding of the commitment one needs in undertaking scientific research.

Professor John D'Angelo worked with Tamas Forgacs on complex variables analogues of Hilbert's 17th problem. During the summer D'Angelo advised Forgacs to take a graduate course from Varolin on Riemann surfaces in the following fall. As a result Forgacs has chosen Varolin to be his thesis advisor. In this case, the REGS program did not result in a published paper, but did succeed in focusing the student's interests and in the early choice of advisor.

## **V. Concerns of the Carnegie Foundation**

The following four questions were asked in preparation for the conference call held 02-26-04.

1. How are your deliberations going? Have you had meetings with your faculty and/or graduate students outside the CID Team? With administrators? With alumni? With other CID partner departments? Have these meetings been productive? What major themes have emerged?
2. Have you made any progress on designing and implementing changes or innovations in your program? Do you have a plan for how you might assess the success of these changes?
3. Have you collected any new data this year, and if so what type? (Surveys, interviews, focus groups, essays, etc.)
4. What would you like to see included in our agenda for the summer meeting?