



# **ANNUAL REPORT**

## **Graduate Program in Operations Research**

**July 1, 2005—June 30, 2006**

# **ANNUAL REPORT**

## **Graduate Program in Operations Research**

**July 1, 2005 – June 30, 2006**

# Table of Contents

|  |    |
|--|----|
| <b>I. Students</b>   |    |
| A. Enrollment .....  | 1  |
| B. Degrees Conferred .....                                   | 1  |
| C. Recruiting .....  | 1  |
| D. Awards and Honors .....                                   | 1  |
| E. Ph.D. Qualifying Exam .....                               | 2  |
| F. Student Support .....                                     | 2  |
| G. Ph.D. Candidates .....                                    | 2  |
| H. Other Activities .....                                    | 2  |
| <b>II. Faculty</b>   |    |
| A. Co-Directors .....  | 2  |
| B. Membership .....  | 2  |
| C. Research and Publications .....                           | 3  |
| D. Honors and Awards .....                                   | 3  |
| E. Faculty Meeting .....                                     | 3  |
| <b>III. Administration and Staff</b>                         |    |
| A. Personnel .....   | 3  |
| B. Facilities and Equipment .....                            | 3  |
| C. Seminar Series .....                                      | 3  |
| D. OR Website .....  | 4  |
| E. Brochure and Newsletter .....                             | 4  |
| F. Alumni .....  | 4  |
| G. OR Program Review .....                                   | 4  |
| <b>IV. Recommendations and Concerns for the Future</b> ..... |    |
| <b>APPENDIX A</b> OR Student Enrollment Summary .....        | 5  |
| <b>APPENDIX B</b> Student Classification .....               | 6  |
| <b>APPENDIX C</b> Graduate Degrees Awarded .....             | 8  |
| <b>APPENDIX D</b> Recruiting – Fall 2005.....                | 9  |
| <b>APPENDIX E</b> Student Honors and Awards .....            | 10 |
| <b>APPENDIX F</b> 2005 Qualifying Exam .....                 | 11 |
| <b>APPENDIX G</b> OR Student Assistantships 2005-2006.....   | 12 |
| <b>APPENDIX H</b> OR Faculty .....                           | 13 |
| <b>APPENDIX I</b> OR Faculty Meeting Minutes.....            | 15 |
| <b>APPENDIX J</b> Equipment Acquired .....                   | 19 |
| <b>APPENDIX K</b> OR Seminar Series .....                    | 20 |

## **I. Students**

### **A. Enrollment**

During Fall 2005 semester fifty-one (51) students were enrolled in the Operations Research Program. Of these, seventeen (33%) were new, twenty-three (45%) were female, eight (16%) were African American, and thirteen (25%) were US students. In combination with Operations Research the following departments were represented: Computer Science, Business Management, Industrial Engineering, Mathematics, and Statistics.

During the Fall semester there were twenty-nine (29) Ph.D. students, eleven (11) MS and eleven (11) MOR students. The only students co-majoring were Raha Akhavantabatabaei and Ali Tafazzoliyazdi in Industrial Engineering.

Three (3) students were admitted beginning Spring 2006, four (4) graduated and one (1) went on leave decreasing the enrollment to forty-nine (49). In Spring 2006 there were thirty (30) Ph.D. students, eight (8) MS and eleven (11) MOR students.

The enrollment summary is provided in APPENDIX A, and a breakdown of OR students classified by department codes is show in APPENDIX B.

### **B. Degrees Conferred**

The program was very productive during the academic year. It graduated a total of sixteen (16) students [three (3) Ph.D., seven (7) MOR, six (6) MS] in Operations Research (including those who graduate in Summer 2006). The names of the graduating students, the degrees awarded and student advisors are listed in APPENDIX C.

### **C. Recruiting**

The Operations Research Admission Committee consisted of Drs. Rouskas (CSC), Chao (IE), and Sivaramakrishnan (Math). The program received ninety-one (91) applications for admission for Fall 2006. From these applicants, eighty-eight (88) students were accepted for admission, and from these, we expect twenty-two (22) students will start their program at the beginning of the Fall Semester. A complete breakdown of the list of applicants in various categories is included in APPENDIX D.

### **D. Awards and Honors**

The qualifications and performances of the OR students were well recognized. Four (8%) of the students received scholarships or fellowships during the academic year. The list includes Dean's Fellowship, Packard Scholarship Award and United States Army scholarships.

Zhe Zhang and Zohreh Asgharzadeh Talebi were nominated by the faculty to present their research at the poster session of the NC State Graduate Research Symposium on March 30, 2006.

Zohreh Asgharzadeh Talebi won the Elmaghraby Award and four (4) students were inducted into the Omega Rho International Honor Society. The complete list of honors and awards received by OR students is included in APPENDIX E.

## **E. Ph.D. Qualifying Exam**

The Ph.D. Qualifying Exam was administered during the week of August 8-12, 2005. A total of eight (8) students registered for the exam. Two students withdrew prior to taking the exam and the remaining six (6) students took the exam. All six students who took the exam passed unconditionally. The names of the students and the examining committee are provided in APPENDIX F.

## **F. Student Support**

During the 2005-2006 academic year, thirty-eight (38) students were supported (23 on teaching assistantships and 15 on research assistantships). The details of the TA/RA assignment are given in APPENDIX G. The OR program would like to recognize the following departments for their support: College of Management, Computer Science, Industrial Engineering, Mathematics, and Statistics.

## **G. Ph.D. Candidates**

During this academic year the following students passed their preliminary Ph.D. exams: Brett Bush (Oct 2005), Dong-Kyoung Choe (May 2006), Chung-Chien Hong (June 2006) and Carin Lightner (May 2006). Brett Bush went on to complete his Ph.D. degree at the end of the first summer session 2006 and the remaining four (4) students are presently Ph.D. Candidates.

## **H. Other Activities**

The following students served as officers of the Student Chapter of INFORMS: Alex Sibley (President), Alex Capaldi (Vice-President), Michele Hill (Treasurer) and Zohreh Asgharzadeh Talebi (Secretary).

# **II. Faculty**

## **A. Co-Directors**

Under the organizational structure reflecting the interdisciplinary nature of the Operations Research programs at NC State, Dr. Negash Medhin (Mathematics) and Dr. Yahya Fathi (Industrial Engineering) served as co-directors of the Operations Research Program.

## **B. Membership**

The OR faculty consisted of sixty-four (64) faculty members who have their academic appointments in eleven participating departments: Industrial Engineering (11), Mathematics (16), Computer Science (13), Statistics (6), Civil Engineering (4), Electrical and Computer Engineering (4), Mechanical and Aerospace Engineering (1), Management (3), Forestry (1), Textiles (3) and two adjunct faculty. A listing of OR faculty members and academic departments is included in APPENDIX H.

## **C. Research and Publications**

Not all faculty members participate to the same extent in the OR program; indeed some are only tangentially involved. This makes it difficult to provide accurate statistics on the activities of the OR faculty body. For a complete listing of research and publications of each faculty member please see the corresponding departmental annual report. Also the OR website includes links to all OR faculty personal web pages.

## **D. Honors and Awards**

Dr. James R. Wilson, Industrial Engineering, was named Fellow of the Institute for Operations Research and the Management Sciences. This is one of the highest honors in the operations research profession.

Dr. Russell E. King, Industrial Engineering, has been elected Fellow of the Institute of Industrial Engineers (IIE). The announcement was made at the IIE annual conference held in May 2006.

Dr. Thom J. Hodgson, Distinguished University Professor of Industrial Engineering and the James T. Ryan Professor of Industrial Engineering and Furniture Manufacturing, is the twenty-first recipient of the R.J. Reynolds Tobacco Company Award for Excellence in Teaching, Research and Extension. Dr. Nino A. Masnari, dean of the College of Engineering, presented Hodgson with the award in a ceremony held at 3 p.m. Thursday, October 20, in 117 Witherspoon Student Center at North Carolina State University. The presentation was followed by Hodgson's lecture, "Monkey with a Typewriter."

## **E. Faculty Meetings**

One faculty meeting was held in Fall 2005 semester and another one in Spring 2006 semester. The minutes of the two meetings are appended to this report as APPENDIX I.

# **III. Administration and Staff**

## **A. Personnel**

Ms. Barbara Walls continued as OR Program Assistant.

## **B. Facilities and Equipment**

In March 2006 the student office and lab in Daniels was moved to Daniels 360.

Items purchased for student offices and computer labs included computers and furniture for student offices and computer lab. A new printer and fax machine were purchased for the Program Assistant. Detailed items are listed in APPENDIX J.

## **C. Seminar Series**

Nine speakers were invited to give talks to OR students in Fall 2005 and eleven speakers were invited in Spring 2006. All seminars were well attended. A detailed listing of seminars is given in APPENDIX K.

## **D. OR Website**

Design of the OR website was modified to create a more user friendly environment for various categories of users. The new website has separate sections for the current students and future students, respectively. It also includes a section for the OR alumni, a new technical report section, and a section for the annual reports.

## **E. Brochure and Newsletter**

A new promotional brochure for the OR program was published. Copies of this brochure are available at the OR program office. A new edition of the OR newsletter was published in May 2006 and copies of this newsletter were mailed to all alumni. Copies were also distributed to the current students and faculty.

## **F. Alumni**

With the help of one of our current students (Mr. Dennis Frank, Ph.D. Student in OR) we launched a major effort to contact all OR alumni and update their contact information. We were able to update the contact information for most of our alumni.

## **G. OR Program Review**

In preparation for an external review of the program scheduled for Spring 2007, a review committee was formed. This committee will serve as an advisory board throughout the review process. The following faculty members agree to serve on this committee:

- Dr. Xiuli Chao
- Dr. Salah Elmaghraby
- Dr. Shu-Cherng Fang
- Dr. Ralph Smith
- Dr. Hien Tran

## **IV. Recommendations and Concerns for the Future**

The current structure of the OR program appears to function well. However, the support from COE, PAMS and the participating departments is essential to maintain program stability and quality.

**APPENDIX A**  
**OR Student Enrollment Summary**

| <b>Enrollment</b> | <b>Fall 2005</b> | <b>Spring 2006</b> |
|-------------------|------------------|--------------------|
|-------------------|------------------|--------------------|

|       |    |    |
|-------|----|----|
| Total | 51 | 49 |
|-------|----|----|

|           |    |    |
|-----------|----|----|
| Continued | 34 | 46 |
| New       | 17 | 3  |

|        |    |    |
|--------|----|----|
| Male   | 28 | 28 |
| Female | 23 | 21 |

|       |    |    |
|-------|----|----|
| Ph.D. | 29 | 30 |
| MS    | 11 | 8  |
| MOR   | 11 | 11 |

|               |    |    |
|---------------|----|----|
| NC/Resident   | 7  | 5  |
| USA           | 13 | 14 |
| International | 31 | 30 |

## APPENDIX B

### Student Classification

| <u>Name</u>                | <u>Degree</u> | <u>Code</u> |
|----------------------------|---------------|-------------|
| Akhavantabatabaei, Raha    | DR            | ORI         |
| Akintunde, Adekunle        | MOR           | OR          |
| Asgharzadeh Talebi, Zohreh | DR            | ORC         |
| Beam, Christopher          | MOR           | ORI         |
| Bhargava, Gaurav           | MOR           | OR          |
| Blair, Edward Tilden       | MOR           | OR          |
| Braymer, Ross              | MOR           | ORM         |
| Bryksina, Elena            | MS            | ORG         |
| Bush, Brett                | DR            | ORI         |
| Capaldi, Alexander         | MOR           | ORM         |
| Chawli, Vidhi              | MS            | OR          |
| Choe, Dong-Kyoung (Annie)  | DR            | ORM         |
| Ding, Chian-Fen            | DR            | ORM         |
| Engelsone, Anna            | DR            | ORM         |
| Erdogan, Saadet Ayca       | DR            | OR          |
| Everette, Jeffrey          | DR            | ORI         |
| Frank, Dennis              | DR            | ORS         |
| Gao, Jing                  | DR            | OR          |
| Hawley, Rachel             | MOR           | ORM         |
| Hill, Michelle             | MS            | OR          |
| Hodge, Ronald              | DR            | ORI         |
| Hong, Chung-chien          | DR            | ORM         |
| Huryasar, Meltem           | MOR           | ORM         |
| Hurgel, Ege                | MS            | OR          |
| Karimi, Sahar              | DR            | ORI         |
| Kim, So Yeon               | DR            | ORM         |
| Koshute, Phillip           | MS            | ORM         |
| Lightner, Carin Ann        | DR            | ORI         |
| Lin, Chuan                 | DR            | ORM         |
| Lin, Frank (Yu-Min)        | DR            | ORI         |
| Liu, Zhe                   | DR            | ORI         |
| Mathur, Apoorv             | MOR           | ORM         |
| Mcclusky, Doug             | MS            | ORC         |
| Osborne, Susan             | DR            | OR          |

| <b><u>Name</u></b>     | <b><u>Degree</u></b> | <b><u>Code</u></b> |
|------------------------|----------------------|--------------------|
| Pearson, Karen         | MOR                  | ORM                |
| Peng, Yuanyuan         | DR                   | OR                 |
| Radhakrishnan, Alamelu | MS                   | ORM                |
| Sibley, Alex           | MOR                  | ORM                |
| Stroman, Jesse Lee     | DR                   | ORM                |
| Sumpter, Raynard       | MOR                  | ORI                |
| Thompson, Maya         | MOR                  | ORM                |
| Viddam, Anusha         | MOR                  | OR                 |
| Wan, Wei               | DR                   | ORS                |
| Wen, Zhi               | DR                   | ORS                |
| Wu, Xinmin             | DR                   | ORG                |
| Yaesoubi, Reza         | MS                   | ORI                |
| Yang, Yipeng           | DR                   | ORM                |
| Yu, Bin                | DR                   | OR                 |
| Zhang, Qing            | DR                   | ORC                |
| Zhang, Wei (Winnie)    | DR                   | ORI                |
| Zhang, Zhe             | DR                   | ORC                |
| Zhong, Jie             | DR                   | ORC                |
| Zhou, Xiang            | DR                   | ORI                |

**APPENDIX C**  
**Graduate Degrees Awarded**

| <b>December 2005</b>     |               |                   |
|--------------------------|---------------|-------------------|
| <b>Graduate</b>          | <b>Degree</b> | <b>Advisor</b>    |
| Bhargava, Gaurav         | MOR           | Dr. Yahya Fathi   |
| Huryasar, Meltem         | MOR           | Dr. Negash Medhin |
| Mathur, Apoorv           | MOR           | Dr. Yahya Fathi   |
| Tabatabaei, Raha Akhavan | MS            | Dr. Yahya Fathi   |

| <b>May 2006</b>   |               |                      |
|-------------------|---------------|----------------------|
| <b>Graduate</b>   | <b>Degree</b> | <b>Advisor</b>       |
| Beam, Christopher | MOR           | Dr. Yahya Fathi      |
| Bryksina, Elena   | MS            | Dr. Handfield        |
| Braymer, Ross     | MOR           | Dr. Negash Medhin    |
| Capaldi, Alex     | MOR           | Dr. Negash Medhin    |
| Sibley, Alex      | MOR           | Dr. Negash Medhin    |
| Zhang, Zhe        | MS            | Dr. David McAllister |
| Zhou, Xiang       | Ph.D.         | Dr. Xiuli Chao       |

| <b>August 2006</b>            |               |                                    |
|-------------------------------|---------------|------------------------------------|
| <b>Graduate</b>               | <b>Degree</b> | <b>Advisor</b>                     |
| Bush, Brett                   | Ph.D.         | Dr. Thom Hodgson                   |
| Asgharzadeh Talebi,<br>Zohreh | MS            | Dr. Yahya Fathi, Dr. Rada Chirkova |
| Karimi, Sahar                 | MS            | Dr. Yahya Fathi                    |
| Engelsone, Anna               | Ph.D.         | Dr. Stephen L. Campbell            |
| Gao, Jing                     | MS            | Dr. Handfield                      |

**APPENDIX D**  
**Recruiting – Fall 2006**

|                    | <b>Applicants</b> | <b>Admitted</b> |
|--------------------|-------------------|-----------------|
| Number of Students | 91                | 88              |
| Ph.D. Students     | 46                | 45              |
| MS Students        | 37                | 36              |
| MOR Students       | 8                 | 7               |
| Male               | 66                | 64              |
| Female             | 25                | 24              |
| International      | 75                | 72              |
| US                 | 16                | 16              |

| <b>Admission Committee</b>  |          |
|-----------------------------|----------|
| Dr. Xiuli Chao              | Member   |
| Dr. Kartik Sivaramakrishnan | Member   |
| Dr. George Rouskas          | Member   |
| Dr. Negash Medhin           | Co-Chair |
| Dr. Yahya Fathi             | Co-Chair |

**APPENDIX E**  
**Student Honors and Awards**

| <b>Student</b>      | <b>Scholarships</b>                       |
|---------------------|---|
| Bush, Brett         | United States Army                        |
| Everette, Jeffrey   | United States Army                        |
| Hodge, Ronald       | College of Engineering Dean's Fellowship  |
| Koshute, Phil       | College of Engineering Dean's Fellowship  |
| Lightner, Carin Ann | Packard Scholarship Award (Fall Semester) |
| Stroman, Jesse      | College of Engineering Dean's Fellowship  |

| <b>Student</b>             | <b>Honor Societies &amp; Awards</b>   |
|----------------------------|---------------------------------------|
| Asgharzadeh Talebi, Zohreh | Omega Rho International Honor Society |
| Braymer, Ross              | Omega Rho International Honor Society |
| Karimi, Sahar              | Omega Rho International Honor Society |
| Wu, Xinmin                 | Omega Rho International Honor Society |
| Asgharzadeh Talebi, Zohreh | Dr. Elmaghraby Distinguished Student  |

**APPENDIX F**  
**August 2005 Qualifying Exam**

**Exam Committee:**

Linear Programming, Dr. Yahya Fathi (coordinator)  
Nonlinear Programming, Dr. Negash Medhin  
Stochastic Processes, Dr. Xiuli Chao  
Dynamical Systems, Dr. Ralph Smith and Dr. Steve Campbell  
Dynamic Programming, Dr. Kazufumi Ito

**The following students took the 2005 Qualifying Exams:**

Asgharzadeh Talebi, Zohreh  
Gao, Jing  
Karimi, Sahar  
Wan, Wei  
Wu, Xinmin  
Zhang, Zhe

**APPENDIX G**  
**OR Student Assistantships 2005-2006**

| Source                 | Fall 2005 |    |       | Spring 2006 |    |       |
|------------------------|-----------|----|-------|-------------|----|-------|
|                        | TA        | RA | Total | TA          | RA | Total |
| Operations Research    | 5         | 1  | 6     | 7           | 0  | 7     |
| College of Management  | 0         | 2  | 2     | 0           | 2  | 2     |
| Computer Science       | 1         | 3  | 4     | 1           | 3  | 4     |
| Industrial Engineering | 3         | 4  | 7     | 4           | 3  | 7     |
| Mathematics            | 13        | 5  | 18    | 12          | 4  | 16    |
| Statistics             | 1         | 0  | 1     | 1           | 0  | 1     |
| Totals                 | 23        | 15 | 38    | 25          | 12 | 37    |

| Type of Support   | Fall 2005 | Spring 2006 |
|-------------------|-----------|-------------|
| TA and Fellowship | 3         | 3           |
| TA                | 20        | 22          |
| RA                | 15        | 12          |
| Self Supported    | 9         | 8           |
| Other             | 4         | 4           |
| Totals            | 51        | 49          |

## APPENDIX H OR Faculty

| <u>Name</u>           | <u>Department</u>                   |
|-----------------------|-------------------------------------|
| John Baugh            | Civil Engineering                   |
| Richard H. Bernhard   | College of Management               |
| Bibhuti Bhattacharyya | Statistics                          |
| E. Downey Brill       | Civil Engineering                   |
| Robert Buche          | Mathematics                         |
| Stephen L. Campbell   | Mathematics                         |
| Xiuli Chao            | Industrial Engineering              |
| Rada Chirkova         | Computer Science                    |
| Mike Devetsikiotis    | Electrical and Computer Engineering |
| Salah E. Elmaghraby   | Industrial Engineering              |
| Shu-Cherng Fang       | Industrial Engineering              |
| Yahya Fathi           | Industrial Engineering              |
| Robert E. Funderlic   | Computer Science                    |
| Subhashis Ghosal      | Statistics                          |
| Robert Handfield      | College of Management               |
| Robert E. Hartwig     | Mathematics                         |
| Thom J. Hodgson       | Industrial Engineering              |
| Duncan M. Holthausen  | College of Management               |
| Thomas L. Honeycutt   | Computer Science                    |
| Ilse Ipsen            | Mathematics                         |
| Kazufumi Ito          | Mathematics                         |
| Jeffrey Joines        | Textiles                            |
| Michael G. Kay        | Industrial Engineering              |
| C. T. Kelley          | Mathematics                         |
| Russell E. King       | Industrial Engineering              |
| John E. Lavery        | Army Research                       |
| Zhilin Li             | Mathematics                         |
| George List           | Civil Engineering                   |
| David F. McAllister   | Computer Science                    |
| Negash Medhin         | Mathematics                         |
| Carl D. Meyer         | Mathematics                         |
| Arne A. Nilsson       | Electrical and Computer Engineering |
| Tao Pang              | Mathematics                         |
| Harry Perros          | Computer Science                    |
| S. Ranji Ranjithan    | Civil Engineering                   |

| <u>Name</u>                      | <u>Department</u>                   |
|----------------------------------|-------------------------------------|
| Thomas W. Reiland                | Statistics                          |
| Stephen Roberts                  | Industrial Engineering              |
| Joseph P. Roise                  | Forestry                            |
| George N. Rouskas                | Computer Science                    |
| Carla D. Savage                  | Computer Science                    |
| Munindar P. Singh                | Computer Science                    |
| Kartik Krishnan Sivaramakrishnan | Mathematics                         |
| Ralph C. Smith                   | Mathematics                         |
| Charles E. Smith                 | Statistics                          |
| Matthias F. Stallman             | Computer Science                    |
| Leonard Stefanski                | Statistics                          |
| William J. Stewart               | Computer Science                    |
| Moon W. Suh                      | Textiles                            |
| Kristin Thoney                   | Textiles                            |
| Hien T. Tran                     | Mathematics                         |
| Ioannis Viniotis                 | Electrical and Computer Engineering |
| Mladen A. Vouk                   | Computer Science                    |
| Wenye Wang                       | Electrical and Computer Engineering |
| Don Warsing                      | College of Management               |
| James R. Wilson                  | Industrial Engineering              |
| Fen Wu                           | Mechanical & Aerospace              |
| Peter Wurman                     | Computer Science                    |
| Ting Yu                          | Computer Science                    |
| Zhao-Bang Zeng                   | Statistics                          |

#### **OR Faculty Emeritus**

|                   |  |
|-------------------|--|
| John W. Bishir    | Mathematics, Professor Emeritus            |
| Joseph C. Dunn    | Mathematics, Professor Emeritus            |
| Clarence J. Maday | Mechanical & Aerospace, Professor Emeritus |
| Henry L. Nuttle   | Industrial Engineering, Professor Emeritus |
| Elmor L. Peterson | Mathematics, Professor Emeritus            |

## APPENDIX I

### OR Faculty Meeting Minutes

**November 8, 2005**

**Attendees:** Dr. Yahya Fathi , Dr. S.C. Fang, Dr. Hien Tran, Dr. Negash Medhin, Dr. Richard Bernhard, Dr. Jim Wilson, Dr. Salah E. Elmaghraby, Dr. Xiuli Chao, Dr. Moon Suh, Dr. Downey Brill, Michelle Hill (Student Representative) and Barbara Walls (OR Program Assistant).

Dr. Fathi opened the meeting and introduced Dr. Medhin as the new co-director as of July 1, 2005.

Minutes from the Spring 2005 OR Faculty meeting were approved as submitted.

Dr. Fathi presented an OR program update. He reported that the program currently has 55 students, 38 continuing and 17 new in Fall 2005. Four students are currently on leave. Of the 55 students 32 are male and 23 female; 34 are Ph.D. students and 21 are master's.

The annual report was presented and the enrollment summary (Appendix A), Graduate Degrees Awarded (Appendix C), Fall 2005 Recruiting (Appendix D), and Student Honors and Awards (Appendix E) were all reviewed by Dr. Fathi. Qualifying exam results for 2005 were discussed with 8 students registering, 2 withdrawing and the remaining 6 passing the exam.

Dr. Elmaghraby announced that he has openings for students for an OR practicum for next semester and encouraged participation.

Dr. Fathi announced that he will be nominating Zohreh Asgharzadehtalebi and Zhe Zhang for poster presentations at the NC State Graduate Research Symposium in March 2006.

Copies of the "Proposal for Concentration in Interdisciplinary Mathematics" were distributed and reviewed by the attendees. Dr. Tran summarized the proposal and Dr. Fathi asked that any comments be sent to him or Dr. Medhin.

Dr. Fathi discussed the new facilities in Burlington and reported that they are very satisfactory and that offices in Daniels first floor will be moving after the first of the year to the third floor of Daniels.

Vitaes for four new faculty members were distributed (Dr. S. Ranji Ranjithan and Dr. George F. List from Civil Engineering, Dr. Donald Warsing from College of Management, and Dr. Kartik Krishnan Sivaramakrishnan from Mathematics). Each nominee was discussed and voting was unanimous on each candidate.

Dr. Elmaghraby stated that the OR program was established in Fall 1970 making 2005 the 35<sup>th</sup> anniversary. He encouraged Dr. Fathi to ask the Dean to fund a party celebrating this milestone.

Dr. Medhin discussed the Graduate School review and draft copies of the outcomes assessment were distributed. Faculty members were asked to return comments to Dr. Medhin.

Dr. Tran presented the OR brochure that he completed and contents were discussed. Michelle Hill (student representative) suggested that recent employers of OR students be listed on the brochure. Everyone agreed that was an excellent idea. OR is currently working on a project to update the alumni list and will include employers on the brochure as appropriate. Dr. Fathi announced that a student is currently working on the OR website and will be adding a Technical Reports section. He urged everyone to add links to their technical reports to the site when it is completed.

Michelle Hill reported on recent INFORMS group activities. A bulletin board in the lobby of Burlington was recently completed. They are currently working on a newsletter and also a bulletin board in the student office area to communicate INFORMS news. They are also highlighting a different student each week by posting answers to a “get to know you” questionnaire on the bulletin board outside the OR office. They are planning a bowling night and a holiday party. In March some of the students are traveling to Baltimore for a conference where they will have an opportunity to work on “real world” problems and compete against other universities.

New business from the floor:

Dr. Wilson encouraged the faculty to nominate OR students for various national awards such as the Inform’s Nicholson Student Paper competition, the Dantzig Award and the IIE’s Pritsker Ph.D. dissertation award.

The meeting was adjourned at 5:15 pm.

## **May 2, 2006**

**Attendees:** Dr. Yahya Fathi , Dr. S.C. Fang, Dr. Hien Tran, Dr. Negash Medhin, Dr. Richard Bernhard, Dr. Salah E. Elmaghraby, Dr. Xiuli Chao, Dr. John Baugh, Dr. Kartik Sivaramakrishnan, Alex Capaldi (Student Representative) and Barbara Walls (OR Program Assistant).

Dr. Fathi opened the meeting.

Minutes from the Fall 2005 OR Faculty meeting were approved as submitted.

Dr. Fathi presented an OR program update. He reported that the student office and lab in Daniels basement was moved in early March to Daniels 360. He reported that the number of students remains steady and presented information from a three year summary report (attached). Recruiting for Fall 2006 is almost complete. The committee reviewed 91 applications and 10 offers (9 TA’s, 1 RA) have been made and accepted. Test scores are about the same as last year. Dr. Fathi recognized the admission committee and thanked them for their work (Dr. Sivaramakrishnan, Math; Dr. Rouskas, CS, and Dr. Chao, IE).

Dr. Fathi asked for suggestions regarding low attendance of faculty and students at OR seminars. Alternative time periods were suggested for consideration.

Dr. Fathi announced that he will be on sabbatical during Fall semester. Dr. Medhin will serve in his absence.

Dr. Zeng’s vita was presented for review as a new faculty member. Dr. Zeng’s nomination was approved unanimously. Dr. Elmaghraby suggested that in the future new faculty members present a seminar before they are nominated for the OR faculty. Dr. Fathi responded that we will try to do so if the nominee’s schedule and the seminar schedule permits. Otherwise we will schedule the seminar as soon as possible.

Five students have registered for the qualifying exam in August 2006. The qualifying exams will be given the week of August 14<sup>th</sup>. The examination committee was formed and the exams are scheduled as follows: Linear Programming (Dr. Fang), Stochastic (Dr. Chao), Dynamical Systems (Dr. Ralph Smith), Non-Linear Programming (Dr. Fang) and Dynamic Programming (Dr. Elmaghraby). Dr. Medhin will be coordinating the exams.

Dr. Medhin gave an update on the Graduate School review of the OR program in January 2007. Three or four potential external reviewers have to be suggested to the graduate school. Dr.

Medhin took names of potential candidates from the OR faculty and will work with other faculty to narrow the list to four names. An internal committee was also formed to serve as an advisory group during the review process.

Dr. Fathi thanked Dr. Tran for his work on the OR brochure. A few modifications were suggested. He also announced that there will be a Spring issue of the newsletter and thanked the Informs officers for their work. The website has been modified and Dr. Fathi encouraged faculty to send technical reports to Barbara Walls for publication on the website. Seminar presentations will also be added to the website as available by the presenter.

Alex Capaldi presented an overview of Informs activities for academic year 2005-2006. Informs sponsored an end of Fall semester pizza party, a bowling night in February, get-to-know you boards featuring new students were posted every week, they designed and sold tee shirts, organized the Spring picnic and coordinated the newsletter. Officers for 2005-2006 were President – Alex Sibley, Vice President – Alex Capaldi, Treasurer – Michelle Hill and Secretary – Zohreh Asgharzadeh. Officers for 2006-2007 will be President – Michelle Hill, Vice-President – Dennis Frank, Treasurer – Rachel Hawley and Secretary – Phil Koshute.

The Elmaghraby award winner for 2005-2006 was Zohreh Asgharzadeh. Her award was presented at the Spring picnic.

New members of Omega Rho include Zohreh Asgharzadeh, Ross Braymer, Sahar Karimi and Xinmin Wu. The 2005-2006 President of Omega Rho was Chung-Chien Hong and the new President will be Zohreh Asgharzadeh.

No new business was presented.

The meeting was adjourned at 5:15 pm.

**Operations Research  
Three Year Summary of Data**

| <b>Student Numbers</b> |                  |                  |                  |
|------------------------|------------------|------------------|------------------|
|                        | <b>2003-2004</b> | <b>2004-2005</b> | <b>2005-2006</b> |
| Total # of Students    | 49               | 52 (1 on leave)  | 51 (4 on leave)  |
| New Students           | 16               | 20               | 17               |
| Male                   | 30               | 37               | 28               |
| Female                 | 19               | 15               | 23               |
| Ph.D.                  | 26               | 33               | 29               |
| Master's               | 23               | 10               | 22               |
| NC Resident            | 12               | 3                | 7                |
| US                     | 10               | 18               | 13               |
| International          | 27               | 31               | 31               |

| <b>Graduate Degrees Awarded</b> |                  |                  |                  |
|---------------------------------|------------------|------------------|------------------|
|                                 | <b>2003-2004</b> | <b>2004-2005</b> | <b>2005-2006</b> |
| MOR                             | 8                | 6                | 10               |
| MS                              | 2                | 3                | 2                |
| Ph.D.                           | 1                | 8                | 4                |
| Totals                          | 11               | 17               | 16               |

## **APPENDIX J**

### **Equipment Acquired**

| <b><u>Equipment</u></b>            | <b><u>Location</u></b>      |
|------------------------------------|-----------------------------|
| HP4250N Printer                    | Program Assistant Office    |
| Brothers Fax Machine               | Program Assistant Office    |
| Fellowes Powershred C-220C         | Program Assistant Office    |
| (6) Dell Precision 380 Mini-Towers | Burlington and Daniels Labs |
| Dell Inspiron 9400 laptop          | Co-Director's office        |
| HP4250N Printer                    | Daniels Computer Lab        |
| (4) Student Desks                  | Daniels Student Office      |

## **APPENDIX K**

### **OR Seminar Series**

#### **Fall 2005**

- |              |  |
|--------------|--|
| Aug 23, 2005 | Welcome Back/Orientation   |
| Sep 8, 2005  | Dr. Jim Wilson, Industrial Engineering<br>“Responsible Authorship and Peer Review”   |
| Sep 15, 2005 | Mr. Matt Ronning, Associate Vice Chancellor for Research Administration,<br>“Research Ethics: Proper Record Keeping”             |
| Sep 20, 2005 | Dr. Radihika Kulkarni, SAS Institute<br>“Adding Analytical Value to Business Intelligence: Sample Applications of SAS/OR”        |
| Oct 4, 2005  | Dr. Subhashis Ghosal<br>“A U-Statistics Based Method for Testing Monotonicity of Nonparametric Regression”                       |
| Oct 11, 2005 | Dr. Kartik Sivaramakrishnan<br>“A Conic Interior Point Decomposition Approach for Large Scale Semidefinite Programming”          |
| Oct 27, 2005 | Dr. Robert L. Smith, University of Michigan<br>“A Fictitious Play Approach to Complex Systems Optimization”                      |
| Nov 10, 2005 | Dr. Yao Zhao, Rutgers University<br>“Analysis and Evaluation of Assemble-to-Order Systems with Stochastic Sequential Lead-Times” |
| Nov 17, 2005 | Stephen Meyer, NCSU Libraries Fellow<br>“Effectively Managing Your Information & Research”                                       |

#### **Spring 2006**

- |              |  |
|--------------|--|
| Jan 17, 2006 | Welcome Back/Orientation   |
| Feb 2, 2006  | Sean X. Zhou<br>“Analysis of Serial Inventory System with Batch Ordering and Nested Replenishment Schedule”  |
| Feb 7, 2006  | Dr. Matthias F. (Matt) Stallman, NCSU Computer Science<br>“Optimal Solutions for Generalized Covering Problems”                                    |
| Feb 14, 2006 | Dr. Samuel Burer, The University of Iowa<br>“A Finite Branch-and-Bound Algorithm for Nonconvex Quadratic Programming via Semidefinite Programming” |
| Feb 28, 2006 | Dr. Don Warsing, NCSU College of Management<br>“Forecast Updating and Supplier Coordination for Complementary Component Purchases”                 |

- Mar 14, 2006 Dr. Abdelhakim Artiba, Ecole de Technologie Supérieure, Montreal, Canada  
"The Integration of Simulation and Optimization for Decision-Making"
- Mar 23, 2006 Brett Bush, OR Ph.D. Candidate  
"Analysis of Fuel Consumption for an Aircraft Deployment with Multiple Aerial Refuelings" (under direction of Dr. Hodgson)
- Mar 30, 2006 Dr. Alice Smith, Dept of IE, Auburn University  
"The Particle Swarm Approach to Optimization with an Application in Facility Location"
- Apr 4, 2006 Dr. Vijay Nair, Univ of Michigan, IOE  
"Taguchi's Robust Parameter Design: A 25-year Retrospective Look at the Contributions and Impact"
- Apr 11, 2006 Dr. Sidney Resnick, Operations & Industrial Engineering, Cornell University  
"Data Network Models of Burstiness"
- Apr 18, 2006 Dr. Ranji Ranjithan, NCSU CCE  
"Evolutionary Algorithms in Addressing Contamination Threat Management in Civil Infrastructures"
- Apr 25, 2006 Dr. Rick Rosenthal, Naval Postgraduate School  
"Secrets of Success with Optimization"