

## REQUIRED COVER PAGE

### APPLICATION FOR FACULTY RESEARCH GRANT

**\*\*All questions must be completed to be considered for grant award.**

<b>Choose one:</b> <input type="checkbox"/> Creative Project <input checked="" type="checkbox"/> Research Project	<b>Date of Last FRG Award (Semester and Year awarded):</b> <u>FALL, 2004</u> <b>Date of ATU Faculty Appointment (Semester and Year):</b> <u>FALL, 2005</u>
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1. Project Title: Morrey Spaces, Op Spaces, and Their Properties  
2. Name of Principal Investigator/Project Director: Chunping Xie  
3. School (abbrev): SS 4. Department: MATH  
5. Campus Mail Address: CORLEY 237 6. PI/PD Campus Phone: 968-0658  
7. Amount Requested: \$2,000 8. Total Cost of Project: \$10,000

9. Does this project involve: 10. Duration of Project: Five to six years

Yes No

- ☐ ☒ human subjects?  
☐ ☒ animals/animal care facility?  
☐ ☒ radioactive materials?  
☐ ☒ hazardous materials?  
☐ ☒ biological agents or toxins restricted by the USA Patriot Act?  
☐ ☒ copyright or patent potential?  
☐ ☒ utilization of space not currently available to the PI/PD?  
☐ ☒ the purchase of equipment/instrumentation/software currently available to the PI/PD?

**NOTE:** If the answer is "yes" to any of the above questions, the investigator must attach appropriate documentation of approval or justification for use/purchase.

#### SIGNATURES


Department Contribution (if applicable): \$ \_\_\_\_\_

Account Number: \_\_\_\_\_

 10-11-05  
Chairperson Date

School Contribution (if applicable): \$ \_\_\_\_\_

Account Number: \_\_\_\_\_

 10-12-05  
Dean Date

#### This Section to be completed by the Office of Academic Affairs

FSBA Committee Award Recommendation: Yes \_\_\_\_\_ No \_\_\_\_\_  
FSBA Committee Proposal Rank: \_\_\_\_\_ of \_\_\_\_\_ Total Proposals.  
Recommendation of VPAA: Yes \_\_\_\_\_ No \_\_\_\_\_  
Recommendation of President: Yes \_\_\_\_\_ No \_\_\_\_\_  
Award Date: \_\_\_\_\_

# **Research Report**

Chunping Xie

Department of Mathematics

Since I got the Faculty Research Grant in last year, I have made some progress in my research toward my goal stated in my last year's proposal. First I have considered the commutators of two important operators, maximal operator and sharp operator on Morrey spaces and found that the commutators are bounded on Morrey spaces. Then I gave a talk about these results I got on the SEAM XXI at the Washington and Lee University in Lexington, VA in April, 2005. Now I am still working on this paper and trying to do some necessary changes and corrections so that I can get this paper published at the end of this year or the beginning of the next year. After this work I am going to consider another problem in this area in the coming year.

# PROPOSED BUDGET FACULTY RESEARCH GRANT

(include budget categories as appropriate)

1. Graduate assistant stipend \$ \_\_\_\_\_  
Fringe benefits @ .4% (4/10 percent) of graduate assistant stipend \_\_\_\_\_

2. Non-work study stipend \_\_\_\_\_  
Fringe benefits @ .4% (4/10 percent) of non-work study stipend \_\_\_\_\_

3. \*Supplies (please list items to be purchased and estimated price per item including taxes and shipping, if appropriate):

Item No. 1 (e.g., software)	Estimated Price	_____
Item No. 2 (e.g., copying costs)	Estimated Price	_____
Item No. 3 (books, etc.)	Estimated Price	<u>\$400</u>
(additional lines as needed)		

Total estimated supplies \$400

4. Travel (please list travel expenditures by date and estimated costs):

Travel No. 1	Estimated Price	<u>\$1600</u>
Travel No. 2	Estimated Price	_____
Travel No. 3	Estimated Price	_____
(additional lines as needed)		

Total estimated travel \$1600

5. \*Capital Outlay (please list items to be purchased and estimated price per item including taxes and shipping, if appropriate):

Item No. 1	Estimated Price	_____
Item No. 2	Estimated Price	_____
Item No. 3	Estimated Price	_____
(additional lines as needed)		

Total estimated capital outlay \_\_\_\_\_

TOTAL PROPOSED BUDGET \$2,000

\*Items purchased under \$2,500 (including taxes and shipping) are considered supply items. Capital Outlay items are those which cost \$2,500 or more (including taxes and shipping). Please contact the Purchasing Office for questionable items.

## REFERENCE

- [1] Chunping Xie, *The Decomposition Theorems for  $Qp$  Spaces*, Arkiv för Matematik, **40**(2002), No.2, 383-401 (with Zhijian Wu)
- [2] Chunping Xie,  *$Qp$  Spaces and Morrey Spaces*, Journal of Functional Analysis, **201** (2003), No.1, 282-297 (with Zhijian Wu)
- [3] Chunping Xie, *Littlewood-Paley Functions and Morrey Spaces*, Far East J. Math. Sci. 17(1), (2005), 81-92
- [4] Commutators of Maximal and Sharp Operators on Morrey Spaces, in preparation

## BUDGET

- 1. Attending SEAM XXII meeting at The University of Florida, Gainesville, Florida  
March 2-5, 2006. About \$1000
- 2. Attending 5<sup>th</sup> Conference on Function Spaces at SIUE, Southern Illinois University,  
Edwardsville, Illinois, May 16-20, 2006.  
About \$600
- 3. Planning to buy 3-4 books and some supplies. About \$400