



## ACS Green Chemistry Institute®

American Chemical Society  
1155 Sixteenth Street, N.W. • Washington, D.C. 20036  
Phone: 202-872-6102 • Fax: 202-872-6206  
URL: [www.acs.org/greenchemistry](http://www.acs.org/greenchemistry) • E-mail: [gci@acs.org](mailto:gci@acs.org)



### ACS GCI PHARMACEUTICAL ROUNDTABLE 2009 RESEARCH GRANT PROGRAM REQUEST FOR PROPOSALS

The ACS GCI Pharmaceutical Roundtable (Roundtable) is a partnership with the ACS Green Chemistry Institute® and pharmaceutical corporations united by a shared commitment to integrate the principles of green chemistry and engineering into the business of drug discovery and production. Current members include AstraZeneca, Boehringer-Ingelheim, Eli Lilly and Company, GlaxoSmithKline, Johnson & Johnson, Merck & Co., Inc., Pfizer Inc, Schering-Plough, and Wyeth. In 2006, the Roundtable members conducted a survey that identified areas in need of focused research to advance the principles of green chemistry and their application in the pharmaceutical industry. Ten chemical transformations and two process related operations were identified as noted in the list below and subsequently published (D.J. Constable, P.J. Dunn, *et al.*, Key Green Chemistry Research Areas- A Perspective from Pharmaceutical Manufacturers, *Green Chemistry*, 2007, **9**, 411 - 420.)

The ACS GCI Pharmaceutical Roundtable requests submission of proposals for review for work on the following targeted research areas. Proposals will be accepted from public and private institutions of higher education worldwide.

- Chemical Transformations of High Interest
  - Amide formation avoiding poor atom economy reagents
  - OH activation for nucleophilic substitution
  - Amide reduction without hydride reagents
  - Safe and environmentally friendly Mitsunobu reactions
  - Oxidation/Epoxidation reactions without the use of chlorinated solvents
- More Aspirational Transformations
  - C-H activation of aromatics (cross couplings avoiding the preparation of haloaromatics)
  - Chiral amine synthesis (aldehyde or ketone + NH<sub>3</sub> + 'X')
  - Asymmetric hydrogenation of unfunctionalized olefins/enamines/imines
  - Green fluorination methods under mild conditions
  - N-Centered chemistry avoiding azides, hydrazine, etc.
- Process Related Targets
  - Solventless reactor cleaning
  - Green alternatives to polar aprotic solvents

Total award is limited to \$160,000 for a grant period of 12 to 24 months. The selection of the awardee(s) will be divided into a pre-proposal and a full proposal phase. Pre-proposals are due to the ACS GCI Pharmaceutical Roundtable on Friday, **September 5, 2008** at 5 p.m. (EDT), no exceptions. Pre-proposals not received by the deadline will not be considered. Submissions must be a pdf file submitted via email to [gcipr@acs.org](mailto:gcipr@acs.org). Only those PIs who have submitted a pre-proposal are eligible to submit full proposals. Investigators invited to submit a full proposal will be notified by Monday, October 13, 2008 with full proposals due by Monday, November 3, 2008 at 5 p.m. (EDT). Funding awards are planned to be announced by December 31, 2008.



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### ACS GCI PHARMACEUTICAL ROUNDTABLE 2009 RESEARCH GRANT PROGRAM

#### History of the ACS GCI Pharmaceutical Roundtable Research Grant Program

In the fall of 2006, the Roundtable issued the first Request for Proposals for the ACS GCI Pharmaceutical Roundtable Research Grant to support research in the key green chemistry chemical transformation or process operations that were previously identified by the organization as being high priority to advance the principles of Green Chemistry (cf. D.J. Constable, P.J. Dunn, *et al.*, Key Green Chemistry Research Areas- A Perspective from Pharmaceutical Manufacturers, *Green Chemistry*, 2007, 9, 411 – 420.). Since the inception of the grant, a total of 57 proposals were received from principal investigators representing 42 universities in countries including, but not limited to: Argentina, Australia, Canada, India, Italy, Portugal, Spain, United Kingdom, and the United States.

Past recipients of the ACS GCI Pharmaceutical Roundtable Research Grant include:

1. Dr. Jianliang Xiao, University of Liverpool (*Chem. Eng. News*, February 12, 2007, 85(7), p.19.)
2. Dr. Robert E. Maleczka, Jr. and Dr. Milton R. Smith, III, Michigan State University (*Chem. Eng. News*, July 30, 2007, 85(31), p.61.)
3. Dr. Michael J. Krische, University of Texas at Austin (*Chem. Eng. News*, March 31, 2008, 86(13), p. 47.)
4. Dr. Chao-Jun Li, McGill University (*Chem. Eng. News*, March 31, 2008, 86(13), p.47).

#### Requirements for Submission

Proposals will only be accepted from public and private institutions of higher education. The grant is not limited to institutions in the United States. Proposals must be submitted through the appropriate institutional office for external funding. For international submissions, if there is no comparable office, submit a pdf of a letter signed by an appropriate university official recognizing the terms of the grant.

Proposed research must focus on the key targeted areas identified by the Roundtable as described in D.J. Constable, P.J. Dunn, *et al.*, Key Green Chemistry Research Areas- A Perspective from Pharmaceutical Manufacturers, *Green Chemistry*, 2007, 9, 411 – 420. Proposals must clearly describe how the proposed research will provide improvements over existing technology that are consistent with the goals of Green Chemistry including improved atom economy, use of less hazardous reagents, more energy efficient processes, elimination of by-products, reduced waste generation, improved environmental, health, and safety and life cycle impacts, catalytic versus stoichiometric methods, and development of inherently safer transformations. Illustrations of the relevance of the proposed technology to synthetic and process related problems within the pharmaceutical industry are encouraged.

Proposals should not address more than two key target transformations or process related activities in the plan of work.

#### Application Deadline

The selection of the awardee(s) will be divided into a pre-proposal and a full proposal phase. Pre-proposals are due to the ACS GCI Pharmaceutical Roundtable on Friday, September 5, 2008 at 5 p.m. (EDT), no exceptions. Pre-proposals not received by the deadline will not be considered. Submissions must be a pdf file submitted via email to [gcipr@acs.org](mailto:gcipr@acs.org). Only those PIs who have submitted a pre-proposal are eligible to submit full proposals. Investigators invited to submit a full proposal will be notified by Monday, October 13, 2008 with full proposals due



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by Monday, November 3, 2008 at 5 p.m. (EDT). Funding awards are planned to be announced by December 31, 2008.

### Pre-Proposal Format

#### A) Title Page (*1 page, 12 pt font, 1-inch margins*)

1. Project Title: Title should include the identification of the key target chemical transformation(s) or the process related activity from the Roundtable list.
2. Principal Investigator:
3. Title / Position(s):
4. Telephone Number(s):
5. Fax Number(s):
6. Postal Mailing Address:
7. E-Mail Address:
8. Research Group url:
9. Co-Investigators and Institution:

#### B) Pre-proposal Summary (*4 page, 12 pt font, 1-inch margins*)

1. Problem/Issue Statement: Summary statement of how the proposed work meets the overall criteria of enhancing “greenness” of this/these transformation(s) relative to current technology.
2. Background: Provide a brief assessment of proposed project in the context of current state of knowledge, demonstrating awareness of green chemistry improvements over current technology.
3. Objectives: Briefly state project objectives as they would appear in a full proposal.
4. Project Approach: Include specific aims, investigations planned, and any preliminary results.
5. Project Timeline
6. Estimated Budget: Total amount requested would include all direct and indirect costs, including fringe benefits, student assistantships, etc; however, at this stage, we do not require a detailed budget. Total award is limited to \$160,000 for a grant period of 12 to 24 months.
  - Inclusive of institutional overhead costs (indirect costs) at the university’s standard rate.
  - Funding would start in January 2009, or later as agreed between the Principal Investigator and the Roundtable.
  - Post-doctoral associate salary and benefits are supported.
  - Graduate student stipend and benefits are supported. Proposals for support of advanced graduate students are highly favored.
  - PI salary supplements will not be supported.
  - Laboratory supplies and instrument use charges are supported.
  - No funds may be allocated for travel, equipment purchase or repair, or administrative support.

#### C) Curriculum Vitae of Project Team Members

Please submit a two page curriculum vitae of all project team members. (Does not count toward your page limit.)

### Full Proposal Format

The full proposal format requirements will be supplied to those who are invited to participate in the second phase of the selection process.

### Report Requirements

- Progress reports are due at 6 month intervals from initiation of research.
- Final comprehensive report is due one month after end of grant period.
- Reports must be submitted as a Word document electronically to [gci@acs.org](mailto:gci@acs.org). Reports will be shared with the member companies of the Roundtable.



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### Intellectual property, publication acknowledgement, and terms of the grant

- The primary purpose of this grant is to publish research to make information publicly available.
- Every patent, United States or foreign, that results from research funded (in part or in its entirety) by the ACS Green Chemistry Institute Pharmaceutical Roundtable Research Grant shall be immediately dedicated to the public, royalty free.
- Each publication prepared in connection with the ACS GCI Pharmaceutical Roundtable Research Grant shall make acknowledgement to the ACS GCI Pharmaceutical Roundtable Research Grant, in the following manner. "Acknowledgement is made to the ACS GCI Pharmaceutical Roundtable Research Grant for support (or partial support) of this research."
- Acceptance of a Roundtable Research Grant will be conditioned upon agreement by the grantee institution that in the event the principal investigator is unable for any reason to conduct the research proposed, the funds, if previously paid by the Roundtable, shall, upon demand, be returned in full to the Roundtable, and further, that in the event the PI is unable for any reason to continue with the research after it has commenced, this grant shall be terminated forthwith and the unexpended and unencumbered balance of any funds theretofore advanced shall be returned to the Roundtable.
- The grantee institution, by acceptance of this grant, provides assurance that support normally provided by the institution for research of the faculty member will not be diminished.
- Applicants may have only one research grant with the ACS GCI Pharmaceutical Roundtable at a time. Current research grant holders may apply for a new grant, provided the current grant will be closed by December 31, 2008. In order to close a grant, the required reports must be received and approved by the ACS GCI Pharmaceutical Roundtable.

For additional information:

Website: [www.acs.org/gcipharmaroundtable](http://www.acs.org/gcipharmaroundtable)

Email: [gcipr@acs.org](mailto:gcipr@acs.org)