



GRADUATE STUDENT COUNCIL

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VU Joint Venture Research Initiative

OVERVIEW

For the past half-century, America's great research universities have been an invaluable asset to the United States in spurring economic growth, improving the health and lives of individuals, and contributing to the progress of society at large through the pursuit and dissemination of new knowledge. Central to the success of this mission has been the strong federal–university partnership that has existed for supporting research and doctoral education. Due to recent austerity measures, research universities are at risk of declining public support and federal funding and must reposition themselves to preserve the strength of their research enterprise so that they may continue to serve as a vital resource to the nation's prosperity [1]. At the same time, research universities must work to evolve their graduate education system and better prepare students to enter the nation's workforce to reflect the reality that most PhD graduates will go on to pursue careers outside of academia [2]. The VU Joint Venture Research Initiative seeks to address these issues by diversifying both research funding sources for faculty and educational opportunities for graduate students through a renewed partnership with industry.

Problem

Although an estimated 60% of academic research in the United States is supported by the federal government, research universities have experienced an alarming erosion in federal support over the past decade. Most evidently, the National Institutes of Health (NIH), the largest federal sponsor of academic research, has declined at an average annual rate of -0.71% since reaching a peak of \$35.6 billion in 2004 (**Figure 1**). NIH appropriations from 1950 through 2004, in comparison, increased at an average annual rate of 8.12% [3]. Given the persisting stagnation in federal research support, research universities must look to adapt to a funding environment that appears unlikely to reflect that of prior decades.

Apart from the current funding outlook, previous decades of unchecked growth have resulted in a surplus of PhDs graduates who have acquired the skillset and training for an academic career but are highly unlikely to find employment in academia. To address the lack of career opportunities for biomedical graduate students currently in the research training pipeline, the NIH has launched the Broadening Experiences in Scientific Training (BEST) award program to “provide additional training and career-development experiences to equip students for various career options [4,5].” While these NIH-funded institutional programs will hopefully lead to more diverse graduate education outcomes, the lack of career development opportunities in graduate education represents a systemic and non-trivial weakness of graduate education that is not limited to the biomedical sciences. Even though graduate education has historically been motivated by the pursuit of an academic career, academic institutions must broaden this outlook if they seek to improve the quality and value of graduate education.

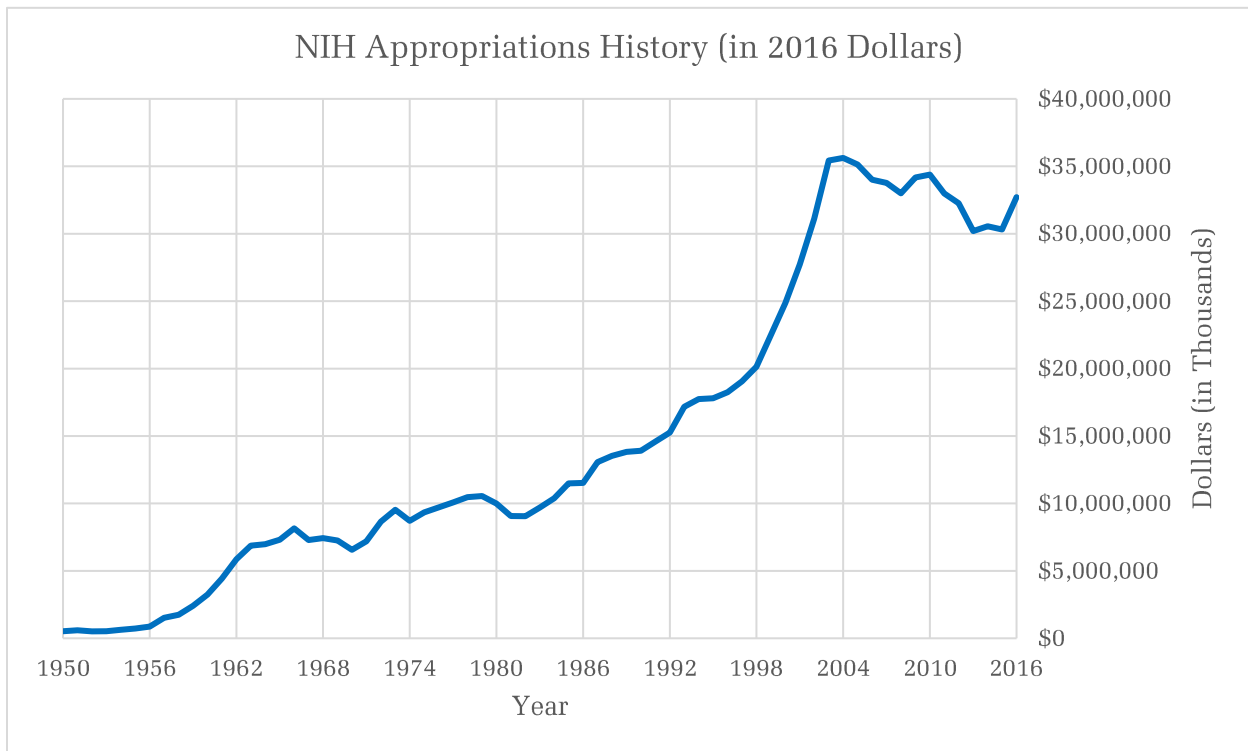


Figure 1. NIH appropriations history by year, adjusted for inflation

Solution

Vanderbilt University can proactively address these concerns by reinventing the mechanisms that support research while fostering a closer relationship with industry, which shares an equal stake in the generation of new knowledge as the seeds of innovation. By

inviting industry members to take on a greater role in sponsoring research, Vanderbilt has the opportunity to accelerate the application of new discoveries in solving pressing scientific, technological, and societal challenges and provide graduate students with experiences that will better equip them to enter the workforce.

IMPACT

The ideas presented in this proposal are borrowed from the blueprint laid out by University of California's Industry-University Cooperative Research Program (IUCRP). Between 1996 and 2007, the IUCRP transformed the University of California system and its role in service to the economy through strategic partnerships with industry that created a new source of research funding for its universities. IUCRP's \$20 million a year investment towards industry-sponsored research grants, which were matched dollar for dollar by university funds, resulted in the development of more than 595 research partnerships with 353 companies and the support of more than 2,100 graduate research assistantships. Furthermore, graduate student researchers that were supported by funded projects gained exposure to diverse industry settings as well as transferable skills in research and development, strategic planning, and technology transfer, making them attractive recruits for business firms and even propelling some to start their own companies [6].

Although the IUCRP was suspended in 2011 due to budget cuts by the State of California, the positive impact that this research program produced for the University of California system cannot go unnoticed. Vanderbilt University has every opportunity to build on the success of the IUCRP within Nashville and the surrounding Middle Tennessee region and possesses the autonomy and flexibility as a private research institution to ensure the long-term efficacy and direction of a similarly construed program. Taken a step further, a research program that couples funding from industry-sponsored faculty projects with the formal support of an institutional training program for graduate students would enable Vanderbilt to increase extramural research funding and the number of supported graduate research assistantships while providing graduate students with experiences and training more closely aligned with non-academic career paths.

GOALS

1. Formalize a research support mechanism that enables businesses to sponsor faculty research projects.

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2. Increase research funding and the number of supported graduate research assistantships through industry-sponsored grants which are matched dollar for dollar by university funds.
 3. Establish a program office or expand the responsibilities of the Center for Technology Transfer & Commercialization (CTTC) to facilitate communication between faculty members and industry executives, assist in the development of cooperative research agreements, and oversee joint industry–university research projects.
 4. Develop a graduate training fellowship program (similar to a T32 institutional training grant program) around graduate students and/or postdoctoral scholars engaged in industry-sponsored research projects.
 5. Provide industry-relevant experiences that will enhance the marketability and further the career goals of graduate students.

IMPLEMENTATION

The VU Joint Venture Research Initiative would be implemented on the faculty level through a dedicated program office. This program office would monitor opportunities for research partnerships, help faculty members build relationships with the private sector through networking engagements, assist in the development of cooperative research agreements, manage intellectual property and licensing agreements, and oversee ongoing research projects. Ideally, the program office would be directed by individuals who have experienced success as “bridge builders” and in crossing university–industry boundaries.

On the student level, graduate students supported by industry-sponsored research projects would be appointed as trainees to the proposed graduate training program for the duration of their faculty mentor’s research agreement. The specific requirements of the training program are open to interpretation but would fundamentally include graduate-level coursework and participation in a seminar series. Due to the diverse backgrounds of students that would be supported by industry-sponsored research projects, any required coursework would be highly flexible and tailored to a trainee’s needs and/or preferences. Likewise, the seminar series would also be interdisciplinary by nature and strive to provide high-level perspectives at the intersection of industry, research, and science. Importantly, this seminar series will organize perspectives from within both academia and industry by inviting industry affiliates to give lectures and provide insights on topics ranging from professional development to the role of research within a given industry sector.

ESTIMATED COST

The long-term efficacy of the VU Joint Venture Research Initiative can be reasonably assessed by a ten-year pilot program, in which Vanderbilt University invests up to \$5 million a year towards industry-sponsored research projects. The estimated cost for human personnel required to establish a program office would likely fall between \$500,000 and \$1 million a year. The stipends and tuition expenses of graduate students engaged in industry-sponsored faculty projects are expected to be covered in full by matching grant funds.

REFERENCES

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UC Discovery Grant Request for Proposals

Spring 2010 Deadlines

PI Letter / Notice of Intent Submission Window:	Monday, January 11, 2010 through Friday, February 12, 2010
PI Letter/Notice of Intent Submission Approvals:	Wednesday, January 20, 2010 through Thursday, February 18, 2010
C&G Official Proposal Submission Deadline	Tuesday, March 2, 2010 (12:00 Noon PT/ 3 PM ET)
Industry Sponsor Letter of Intent to Fund	Friday, March 12, 2010
Expected Notification of Review Outcome:	Monday, May 3, 2010
Research Agreement Deadline:	Friday, May 28, 2010
Research Commences:	Tuesday, June 1, 2010

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Questions regarding this RFP, the Letter/Notice of Intent, or Proposal Submission should be directed to the Research Program Application & Review Center (PARC) at PARC@ucop.edu - 510/987-9386

Downloadable copies of this RFP, Application Materials and Program Updates can be found at <http://www.ucop.edu/ucdiscovery>

General background about UC Discovery Grants (UCDG) is available at <http://www.ucdiscovery.org/welcome.asp>

I. UC Discovery Grant Overview

The University of California Discovery Grant opportunity (UCDG) promotes collaborations between University of California (UC) researchers and industry partners in the interest of supporting UC researchers and trainees, strengthening the state's economy, and serving the public good. The UCDG is a matching grant mechanism; research projects are jointly funded by a UC Discovery Grant and a required industry matching contribution.

All projects are expected to provide high quality research experiences for graduate students and/or postdoctoral scholars. Industry Sponsors must meet the eligibility requirements and be able to commit matching funds for the entire project period proposed. If the proposal is approved, the Industry Sponsor(s) will share the direct costs of the project with the University of California and contribute applicable indirect costs.

A. Program Goals & Funding Priorities:

- Advance knowledge through supporting high-quality research relevant to California's economy;
- Build lasting relationships between UC researchers and industry partners to enhance the state's economy and to help address critical problems facing California;
- Enhance student training to prepare California's future workforce and industry leaders, and position California for international competitiveness in emerging areas;
- Accelerate the transfer of research discoveries and technological advancements to California industry, for public benefit.

UCDG solicits research proposals involving pioneering studies that are of potential significant benefit to the California economy. Proposed research should demonstrate significant potential for research discoveries and the rapid commercialization of related technological advancements, as well as significant benefit to California and its economy. Benefit to California and its economy include:

- Accelerating innovation in California and creating the foundation for new technologies and products
- Growing California's skilled workforce and creating the foundation for new California jobs
- Increasing competitiveness of California companies, particularly to attract greater investments and retain jobs in California
- Establishing the foundation for creating new California companies;
- Identifying new solutions to critical California problems.

Discovery Grant awards are highly competitive. We anticipate UC matching funds of \$3M available for the Discovery program this cycle.

B. Solicited Research Fields:

UC Discovery Grants are *open to all fields of research* in which the proposed research fulfills the goals and funding priorities of the program outlined above. Historically, funded research fields have included, but are not limited to:

- Biotechnology, Health, and Information Technology for Life Sciences

- Communications, Networking, Digital Media and Internet Enabled Services
- Electronics Design, Manufacturing and New Materials
- Energy, Environment and Cleantechology
- Microelectronics and Computing Innovations
- Nanotechnology

Proposals to fund clinical trials are not eligible. Please see [Appendix D. Research Field Descriptions](#) for additional description of Research Fields listed above.

II. Award Types

Proposals may span research from basic through proof-of-concept stages. Two types of awards are offered: **Discovery Seed Funding Grants (DSF)**, and **Discovery Research and Training Grants (DRT)**, described below:

A. Discovery Seed Funding Grants.

Discovery Seed Funding Grants are a simple, cash-only mechanism intended to incentivize new collaborations for a one year period. The award should enable investigators to generate preliminary data that could be used to expand their industry research partnership and/or position them to apply for a Discovery Research and Training Grant. Early- career faculty, as well as established faculty pursuing research in a new field, are encouraged to apply.

A DSF grant:

- is awarded on a one-time basis only;
- provides funding for one year with a possible second year extension; *and*
- is supported by a matching gift from, or sponsored research agreement with, one or more eligible Industry Sponsors. The total cash amount of the gift or matching grant is a maximum of \$75,000. The minimum allowable Industry Sponsor matching contribution for DSF grants is \$15,000.

B. Discovery Research and Training Grants

A *Discovery Research and Training Grant* is a more flexible mechanism that offers multi-year project periods for substantive research projects, incentives for in-kind contributions and opportunities for UC systemwide collaboration. Applicants may request support for new or resubmitted proposals, as well as competitive renewal proposals for currently supported DRT projects.

A DRT grant:

- involves individual investigators or investigator teams from one or more UC campuses;
- provides funding for one to four years;
- is supported by sponsored research agreements between UC and one or more eligible Industry Sponsors;
- is matched by Industry Sponsor contributions of primarily cash for direct and indirect costs, and
- offers an incentive award for Industry Sponsor contributions of essential and well-justified in-kind contributions.

DRT grants typically range from \$50,000 to \$2 million per year in combined UC Discovery Grant funds plus Industry Sponsor matching contributions of cash. The minimum allowable Industry Sponsor matching contribution for DRT grants is \$25,000.

III. How to Apply

The application process consists of three steps:

1. Submission of a Letter/Notice of Intent (LOI): Submission and approval of a LOI is required in order to submit a full proposal. LOI's are non-binding and used for administrative and review planning purposes. Once the LOI is approved, applicants may submit a full proposal. LOIs may be submitted beginning Monday, January 11, 2010 through Friday, February 12, 2010. LOIs must be submitted on proposalCENTRAL and will be approved on a rolling basis beginning Wednesday, January 20, 2010 through Thursday, February 18, 2010.
2. Proposal Submission: Upon approval of the LOI, applicants gain access to the full application materials on proposalCENTRAL. Complete applications must be received by the deadline **Tuesday, March 2, 2010 (12:00 Noon PT/3 PM ET)**. Applicants must follow the Application Instructions and Guidelines. The Instructions, Application Forms and any Program updates are available for your reference at <http://www.ucop.edu/ucdiscovery> However, *only applications submitted through proposalCENTRAL by the deadline will be accepted for review and eligible for funding.*
3. Industry Sponsor Letter of Intent to Fund: An Industry Sponsor letter of intent to fund the proposed project through a matching gift (DSF) or grant (DSF or DRT) must be submitted with the proposal, confirming the amount of the company's financial contribution and a commitment to negotiate a research agreement, when required, consistent with the terms set forth in this RFP. In cases of more than one industry sponsor, each sponsor must submit a letter. Please note: Industry Sponsor Letters must be submitted **via email** to parc@ucop.edu by **Friday, March 12, 2010**. The subject line of the email must contain the PI Name and proposalCENTRAL generated Proposal ID Number. *Original hard copies will not be accepted.*

LOIs and proposals must be initiated by the PI and submitted by the campus through the online proposal system proposalCENTRAL (<http://proposalcentral.altum.com/>). PIs must create a proposalCENTRAL profile and grant their campus C&G officer administrative access in order to apply.

IV. Review Criteria for UC Discovery Grants

UC Discovery Grants are peer-reviewed on a competitive basis by scientists and engineers from both within and outside of the University of California. Proposals are evaluated for intellectual merit and relevance to the UCDG program goals and funding priorities. Review criteria are listed below.

- Research Excellence, as demonstrated by an innovative, well-conceived, high-quality, and feasible research plan aimed at solving an important problem and advancing knowledge. Novelty and quality are demonstrated with reference to previous work and state of the field. Feasibility includes achievable milestones and timelines for the proposed scope of the project.
- Qualifications of Personnel, as demonstrated by the leadership and meaningful engagement of well-qualified personnel, and inclusion of early-career faculty as investigators. For

Research and Training (DRT) awards, evaluation of personnel includes evidence of a thesis-quality research/training experience for graduate students and/or high-quality research experience for postdoctoral researchers. Seed Funding (DSF) proposals should lay the foundation for thesis-quality research/training experience for graduate students and/or high-quality research experience for postdoctoral researchers if the research is successful.

- Resources and Facilities, as demonstrated by an appropriate, well-defined budget, and sufficient access to adequate facilities, infrastructure, and other resources necessary for the conduct of the proposed research.
- Benefit to California, as demonstrated by the potential to significantly benefit the State, its economy, and/or the public good by addressing critical issues facing California. Proposed outcomes/benefits may include enhancing the skilled workforce, creating or retaining jobs, increasing competitiveness of CA industries, attracting investments, generating new solutions and/or establishing the foundation for creating new technologies or products to solve problems, among others.

V. Review of Proposals and Funding Decisions

Because of the multidisciplinary composition of panels, applicants are encouraged to avoid jargon and to prepare their proposals in a manner comprehensible to a general scientific audience. Applicants may submit the names of potential reviewers who are not affiliated with the applicant's campus or Laboratory. Applicants may request the exclusion of certain reviewers, and such requests *must* include a brief explanation/justification for such exclusion. The University of California Office of Research & Graduate Studies will constitute the panels, assign reviewers, and make final determinations regarding panel composition. Private sector/industry scientists will not be included among reviewers. Reviewers will be asked to protect the confidentiality of proposals and are expected to disqualify themselves in cases of potential conflict of interest. Proposals will be archived as part of the award record and will be subject to release under the California Public Records Act.

Panels will score proposals and generate a rank-ordered list of applications recommended for funding. Funding recommendations across the portfolio are made by the UCDG Portfolio Committee based on review outcome and program budgetary considerations. All awards are subject to final approval by the Vice President for Research and Graduate Studies, and availability of funding. Applicants can expect to receive notification of review outcome on Monday, May 3, 2010.

VI. University Applicant Eligibility Criteria

Any researcher with Principal Investigator (PI) status at the University of California is eligible to apply. Applicants with a waiver of UC PI status must submit, with the proposal, documentation of the approved waiver authorized by the appropriate campus official. Lawrence Berkeley, Lawrence Livermore and Los Alamos National Laboratory researchers who hold PI status at a UC campus may submit proposals through that campus.

VII. Industry Sponsor Participation Criteria

In order to participate in the Discovery Program, Industry Sponsors must meet both the eligibility criteria and application requirements outlined below. Please note specific guidelines for start-up companies.

A. Industry Sponsor Eligibility

A participating Industry Sponsor must be either a for-profit company or a California Agricultural Market Order Board and must satisfy the requirements for at least one category described below.

[See http://ucdiscoverygrant.org/sponsors/ag_board.htm for a list of qualifying California Agricultural Market Order Boards.]

Category 1. CA Headquartered or a CA Market Order Board

A for-profit company headquartered in CA and registered with the CA Secretary of State, or a qualifying CA Agricultural Market Order Board.

Category 2. CA R&D or Manufacturing Division

A division of a for-profit company located in CA that performs research and development or manufacturing relevant to the proposed project and is registered with the CA Secretary of State.

Category 3. Proposed Research of Potential Demonstrable and Unique Benefit to California

A for-profit company (to which criteria 1 or 2 do not apply) proposing to sponsor research that holds strong potential to demonstrably and uniquely benefit the CA economy, its industry, and its public. To demonstrate this criterion, applicants may provide, for example, a letter of endorsement of the research project from a CA industry-specific or regional economic development group or from a CA Agricultural Market Order Board.

Start-up Companies -- Additional Application Requirement:

In addition to demonstrating registration with the California Secretary of State, **start-up companies must** provide a detailed business plan demonstrating an intent to develop research and development or manufacturing operations in California.

B. Industry Sponsor Application Requirements:

As part of the application, industry partners must provide a Letter of Intent to provide the gift or matching funds as described in the Application Instructions available online at proposalCENTRAL <http://proposalcentral.altum.com> or at the following address <http://www.ucop.edu/ucdiscovery> and must designate the following personnel to the project:

1. A **Technical Liaison** who is the Industry Sponsor's scientific counterpart to the UC principal investigator (PI), and whose expertise and role in the sponsoring company is relevant to the proposed research. The Industry Sponsor technical liaison may not be a member of the proposed UC investigative team.

2. A **Financial Liaison** who has the authority to make the financial commitment to the proposal and who acts as the Industry Sponsor's financial contact.

3. A **Research Agreement/Gift Liaison** who will serve as the point of contact with the UC campus for negotiation and execution of the sponsored research agreement in support of the grant or for the distribution of the gift for seed funding grants.

Awards are contingent on availability of funding.

Additional Application Information is provided in the attached appendices.

Appendix A. Application Instructions and Electronic Submission

UC Discovery Grant Application Instructions provide detailed guidance on application materials, format and allowable costs. Detailed Application Instructions will be available at <http://www.ucop.edu/ucdiscovery>. The Application Instructions provide details on submitting the proposal through proposalCENTRAL as well as the required elements of the application.

Notices of intent and proposals must be initiated by the PI and submitted by the campus through proposalCENTRAL (<http://proposalcentral.altum.com/>). PIs must create a proposalCENTRAL profile and grant their campus C&G officer administrative access in order to apply. Technical support is available through proposalCENTRAL (Monday – Friday 8:00 AM – 5:00 PM Eastern Time – please note that from California you must call between 5:00 AM and 2:00 PM).

Required elements of the application include:

- Abstract
- Research Plan including project milestones and benefit to California
- Detailed budgets as described in the Application Instructions
- Industry Sponsor Information
- Contract and Grant Officer submission approval
- Competitive Renewals and Resubmissions have additional requirements described in the Application Instructions

Appendix B. UC Discovery Grant Award Calculation

The UC Discovery Grant was developed as a mechanism to enable the State and the University to share the direct costs of a meritorious research project with the Industry Sponsor(s). Industry Sponsors propose a total cash commitment to match the UC Discovery Grant award. The Industry Sponsor total cash commitment includes the sponsor's obligations for direct and indirect costs (if applicable). Indirect costs vary according to the grant mechanism, the structure of the project budget and among the campuses. All industry contributions are paid directly to the UC investigator's home campus.

Discovery Seed Funding (DSF) Grant

The DSF award may not exceed **70%** of the Industry Sponsor's total cash grant or contract commitment, or **40%** of the Industry Sponsor's total cash gift. Gifts are in the amount of \$15,000 - \$75,000.

Discovery Research and Training (DRT) Grant

The DRT award is composed of a **primary award** based on the Industry Sponsor's total cash commitment and may also include an **in-kind incentive award** based on a proposed in-kind matching contribution from the Industry Sponsor.

- **DRT Primary Award**: The UC Discovery Grant primary award may be no more than **70%** of the Industry Sponsor's total cash commitment, i.e., the Industry Sponsor's total direct and indirect cost commitment.

- **DRT In-kind Incentive Award**: The UC Discovery Grant in-kind incentive award may be no more than 50% of the value of the Industry Sponsor's in-kind contribution and is capped at 30% of the Industry Sponsor's total cash commitment, i.e., the combined primary and in-kind incentive award will not exceed the Industry Sponsor's total cash commitment.

Proposed In-kind contributions must meet the two criterion listed below, which are to be demonstrated by the applicant in the proposal and are subject to peer review. The in-kind contribution should be:

1. state of the art and essential for the conduct of the research; and
2. assigned a reasonable value by the Industry Sponsor.

Industry Sponsor Cash and In-kind Matching Contributions

Allowable cash matching contributions:

- will be committed by an eligible Industry Sponsor specifically for the approved research project and do not represent funds that would have come to the University under other programs or for other purposes. For example, funds awarded to UC for membership in an industrial affiliate or liaison program for research centers are ineligible as a matching contribution;
- must be expended within the period of the proposed research project;
- may not include state or federal flow-through fund sources; and
- in the case of a gift, are subject to UC gift policies and conformance with campus-based procedures.

Allowable in-kind matching contributions and guidelines for establishing value

- Commercial services: A commercial service is defined as a service regularly sold by the Industry Sponsor for a standard price/price schedule, and not a 'one of a kind' valuation.
- Materials, Supplies and Reagents: If materials or reagents are manufactured by the Industry Sponsor, their dollar value is limited to the actual production costs (i.e., time and materials).
- Equipment and Software: The dollar value of equipment and software is limited to the purchase costs to the Industry Sponsor (minus depreciation, if used equipment) or to the lease or other regular fee to the University, i.e. to the University's regular discounted purchase price with the educational discount.

In-kind matching contributions that are not allowed

- Salaries and other expenditures related to activities undertaken by the Industry Sponsor in connection with the proposed project.

The UC Discovery Grant program reserves the right not to initiate new grants that involve Industry Sponsors whose matching cash or in-kind contribution is currently in arrears for any ongoing or past UC Discovery Grant(s).

Examples of UC Discovery Grant Award Calculations

1. A California company commits \$75,000 (in the form of a grant for direct and indirect costs) as a total cash commitment to the project for a Discovery Seed Funding Grant.

- The DSF award is \$52,500.

2. A California company commits \$75,000 (in the form of a gift) as a total cash commitment to the project for a Discovery Seed Funding Grant.

- The DSF award is \$30,000.

3. A California company or Agricultural Market Order Board commits \$100,000 as a total cash commitment to the project for a Discovery Research and Training Grant.

- The DRT primary award is \$70,000.

4. A California company commits \$100,000 as a total cash commitment to the project and \$10,000 in-kind to match an incentive award for a Discovery Research and Training Grant.

- The DRT primary award is \$70,000.

- The DRT in-kind incentive award is \$5,000.

- The DRT total award is \$75,000.

- *To maximize the in-kind incentive award, the company would need to contribute \$60,000 in-kind.*

5. A California company commits \$100,000 as a total cash commitment to the project and \$100,000 in-kind to match an incentive award for a Discovery Research and Training Grant.

- The DRT primary award is \$70,000.

- The DRT in-kind incentive award maximum is \$30,000.

- The DRT total award is \$100,000.

- *The company is contributing excess in-kind in the amount of \$70,000, which adds value to the project but exceeds the amount allowed for matching.*

In all cases:

After determining the project budget, the campus will notify the Industry Sponsor how much of the total cash commitment will be allocated for indirect costs (if applicable).

Appendix C. Research Agreements and University Research Policy

Central goals of the Program are to incentivize new research partnerships and facilitate the prompt transfer of University-developed technology to the marketplace for public benefit. The University agrees to negotiate reasonable and flexible terms in UC Discovery Grant Research Agreements to accomplish these goals.

The Research Agreement will ensure that the Industry Sponsor contribution, when committed in the form of a grant or contract, is dedicated to the proposed research and that the matching contribution is not contributed as a subcontract that may carry obligations to a third party.

Research agreements in support of the proposal will be negotiated and executed by the UC campuses and governed by standard UC policies. If intellectual property clauses are desired for the research agreement, it is expected that standard UC policies apply. The University does not require that research agreements in support of a UC Discovery Grant contain intellectual property clauses and does not impose any specific intellectual property terms.

Applicants are strongly encouraged, at the earliest possible time, to consult with the campus Contracts and Grants office on the general outline of terms for research agreements. Agreement on the general outline of the terms should be reached prior to submission of the proposal so that the Research Agreement can be finalized by the specified deadline.

The appropriate campus office can be identified at: <http://www.ucop.edu/ott/contacts.html>. Projects approved for funding will not receive UC Discovery Grant funds prior to completion of the Research Agreement.

• Cost and Payment

The UCDG and the Industry Sponsor will share the direct costs of the approved research project budget. The Industry Sponsor will contribute its share of the applicable indirect costs; the University will waive recovery of the indirect costs applicable to UCDG's contribution. The Industry Sponsor will be expected to make quarterly, semi-annual, or annual advance payments on receipt of an invoice from the administering campus. Annual advance payments are encouraged. UC Discovery Grant funds will be allocated on an annual basis.

The amount of the UCDG and Industry Sponsor contributions and the Industry Sponsor's payment schedule must be set forth in the research agreement.

• Proprietary Data

It is not expected that proprietary data will be exchanged, except on a very limited basis as necessary background data for the proposed project. The University will use reasonable efforts to keep confidential the Industry Sponsor's proprietary data and material when it is clearly marked, but cannot be held financially liable for inadvertent disclosure. The Industry Sponsor may be granted a reasonable period of time to review proposed publications to identify any inadvertent disclosure of proprietary data.

• Publication

A fundamental tenet of the University is that the teaching and research environment should be open so that ideas can be exchanged freely among faculty and students. The University's research

activities are conducted as an integral part of the total educational program, and these activities often form the basis for articles in professional journals and student dissertations. The University will undertake a UC Discovery Grant with the understanding that the scientific results can be published. If desired, Industry Sponsors can be given a thirty (30) day period to review publications for identification of any enabling disclosure of patentable inventions, and publication can be delayed an additional sixty (60) days in order to file a patent application.

- Termination

Either party may terminate the agreement upon reasonable notice to the other party [usually sixty (60) to ninety (90) days]. The Industry Sponsor would be expected to reimburse the University for the Industry Sponsor share of the costs incurred through the termination date, including any outstanding obligations which cannot be cancelled.

Graduate student support is a non-cancelable obligation for the entire project period, even for multi-year projects. In the event that the project is terminated early by the Industry Sponsor or the University, the Industry Sponsor and the UCDG must continue to support the graduate student commitments to the project for the duration of the academic year in which the project is terminated.

- Liability, Risk, and Best Efforts

Because research, by its nature, is unpredictable and without guarantee of successful results, University research is conducted on a "best efforts" basis. At the same time, research projects are organized in a manner that is sensitive to the differing time constraints of the Industry Sponsor. The University receives no fee or profit on its research. For this reason, and also because it is inconsistent with the best efforts principle, the University will not accept contract provisions that guarantee results, impose penalties for failure to make progress by firm deadline, or provide for withholding of payment if the sponsor is not satisfied with the results. While the University also cannot provide any warranty about the performance of research results, the University will agree to indemnify the Industry Sponsor for the conduct of University employees and students in the performance of the research.

- Nondiscrimination and Affirmative Action

It is the policy of the University not to engage in discrimination against or harassment of any person employed or seeking employment with the University of California on the basis of race, color, national origin, religion, sex, physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (special disabled veteran, Vietnam-era veteran, or any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized). This policy applies to all employment practices, including recruitment, selection, promotion, transfer, merit increase, salary, training and development, demotion, and separation. This policy is intended to be consistent with the provisions of applicable State and federal laws and University policies.

- Conflict of Interest Policy

Principal Investigators and all other investigators who have independent responsibility and authority for the design, conduct, and reporting of proposed research activities are required to comply with the University's Conflict of Interest policy. Under this policy, Principal Investigators are responsible for informing all project participants of requirements to disclose financial interests to local conflict of interest administrators.

As a condition of accepting UC Discovery Grant funding, the investigator's campus must certify that it accepts responsibility for all aspects of the conflict of interest review and management process according to UC policy and standard campus procedures.

- Other Research Policies

Compliance with University and campus policies on research is required. As a condition of accepting UC Discovery Grant funding, the investigator's campus must certify that it accepts responsibility for managing all aspects of the institutional review and approval for projects involving human subjects and/or animal testing, according to UC policy and standard campus procedures.

Appendix D. Research Field Descriptions

The following field descriptions are intended as a general guide to the kinds of research historically funded by the Discovery Grant program. Research in other areas that fulfills the goals and funding priorities of the program is also eligible in accordance with the guidelines provided in this Call.

• **Biotechnology**

This field seeks innovative projects that have the potential to make a significant impact in the field of agricultural, marine, biological or medical sciences. Proposals involving the full spectrum of research activities related to biotechnology from bench research to clinically-based studies will be considered. Preference is given to proposals involving innovation, discovery, and concept development. Projects that focus on medical devices, diagnostic assays, or pharmaceutical agents are welcome, however the project must bring UC innovation, discovery, and expertise to their development, not simply provide UC services or access to materials and patients for the conduct of a clinical trial.

• **Communications and Networking**

The scope of this field includes communications systems (e.g. wireless transceivers, digital subscriber lines, fiber optic systems, coding theory), networking (e.g. high speed networks, multimedia networks, low bit rate wireless networks, interfacing of networks with each other and the physical world, protocols), components (e.g. antenna systems, integrated and embedded radios, switches, light wave amplifiers), and design tools to support communications systems and network development.

• **Digital Media and Internet Enabled Services**

This field seeks research in basic sciences and engineering, as well as content development research, that is essential to and drives digital media technologies and internet enabled services. Supported research may involve a diverse set of disciplines, including but not limited to: electrical engineering, computer science, information sciences, arts, and education among others.

Focus areas include: Digital Arts, Digital Music, Theater/telematics, Electronic Gaming, E-Science, E-Government, Information Technology, Computational Science and Engineering, Virtual Worlds, Web Media Tools, Search Engines, Digital Worlds, Cyber-infrastructure, Digital Film, Media Management, Digital News, E-Education, Telemedicine, Cognitive Science, and Internet Enabled Services.

• **Electronics Design, Manufacturing and New Materials**

Research areas related to electronics design, manufacturing, and new materials include basic sciences and a range of engineering disciplines addressing next generation technologies and products, and the following closely related areas:

- novel materials and thin film structures;
- innovative processing for integrated circuits, MEMS, sensors, flat panel displays, storage media, optoelectronics, photonics, miniaturized medical devices, etc.;
- advanced equipment design;
- process integration;
- sensors, metrology and control;
- physics and chemistry of electronics processes;
- signal processing, modeling and innovative software techniques;

- environmentally clean manufacturing;
- vacuum electronics, e.g., high power tubes, CRTs;
- electromagnetic devices and subsystems, e.g., antennas, data storage;
- system interconnection materials and manufacturing processes;
- design for electronics manufacturability;
- component and system packaging and production testing;
- quality assurance in electronics manufacturing;
- electronics production planning and scheduling tools;
- design of MEMS and electronic components; and
- design of electronic systems.

• Energy, Environment and Cleantechology

This area includes research on emerging technologies to produce and utilize reliable, sustainable, efficient energy, as well as research projects focused on environmental science and technology.

Some examples include:

- increasing energy efficiency through advances in materials, software technology, integrated circuits and sensor technology, biological and electronics information systems, network technology, modeling, etc.;
- improved energy efficiency in appliances, lighting, vehicles, and buildings,
- developing systems approaches to energy efficiency that enable “smart” processes and, such as manufacturing, and “smart” infrastructure (both natural and built), such as transportation network modeling;
- developing new energy sources that are reliable, sustainable, and renewable from, for example, alternative feedstocks and production systems using plant materials and biological or biochemical generation processes;
- improving energy storage, distribution, and delivery through, for example, photovoltaics, hydrogen storage appliances, innovative battery design, fuel cell integration, integrated circuit and sensor net technology, and on-demand response simulation technology;
- reducing the environmental impacts associated with energy production and fuel consumption through, for example, integrated research on air and water quality, sensor and network systems, and dynamic modeling and prediction technology;
- improving water and wastewater treatment methods, including advances in water reuse technology;
- reducing or ameliorating the effects of pollution on ecosystems;
- addressing issues surrounding environmental sustainability and climate change;
- research in environmental and occupational health (i.e. air quality, nuclear waste management, environmental pathogens);
- research in geomorphology;
- effects of chemical exposure on the environment and human health.

• Health and Wellness

This field seeks research projects on fundamental problems for which solutions will improve the quality of health care delivery and enable society to:

- maintain wellness through deployment of home, hospital, and regional scale health monitoring systems based upon, for example, integrated circuits, nanoscale materials and devices, sensor technology, monitoring devices, imaging technology, innovative software, or new computation techniques for high performance information systems (including, for example, dynamic digital medical records);
- monitor, track, and manage infectious disease by, for example, integrating sensor technology, wireless communications, information systems, and high performance

computing, by developing dynamic clinical information systems, and by developing accurate spatial modeling technology and on-demand response simulation technology;

- enhance patient assessment and management through electronic medical record technology integrated into hospital, regional, and national scale cyber-infrastructures;
- improve prevention, diagnosis and treatment of disease through, for example, highly sensitive and accurate diagnostics, novel prevention and therapeutic approaches, and medical devices derived from converged advances in materials sciences, nanomedicine, electronics, biotechnology, biomedical engineering, tissue engineering, biocompatibility, imaging and visualization technology, and information systems technology;
- enhance the precision, accuracy, and safety of surgical interventions through, for example, new and nano-scale materials and devices, integrated circuits, sensor technology, imaging technology, unfailingly reliable information system, and computer-aided surgical systems.

• **Information Technology for Life Sciences**

This field supports information technology research and development in all life science-related disciplines including agricultural sciences, animal sciences, chemistry, molecular biology, genetics, biological sciences, environmental sciences, medicine, veterinary medicine, zoology, and other life sciences. The supported information technology research can tap the University's diverse resources in the mathematical, statistical, engineering, computational, and information sciences.

• **Microelectronics Innovation and Computer Research**

Research in this field is expected to support innovation in microelectronics and its applications in computer sciences, information sciences, and its necessary antecedents in other physical science disciplines. Research is envisioned to lead to the development of new products and technologies. Proposals should be relevant to industrial activities in microelectronics, computer science, and their application.

• **Nanotechnology**

Research in nanotechnology is expected to address fundamental problems whose solutions will enable the rapid application of nanoscale materials and devices across a rapidly proliferating spectrum of practical applications, especially those that advance California's technological leadership. Meaningful solutions are sought for problems such as the following:

- design, integration, and rapid deployment of heterogeneous nanocomponents into appliances, devices, and systems involving, for example, nanostructured electronic, photonic, photovoltaic, and magnetic materials and devices, sensors, integrated circuits, and information technology systems;
- nanofabrication-enabled reliable nanomanufacturing;
- bio-inspired nanotechnology;
- medical monitoring, diagnosis, and treatment involving, for example, nanoscale materials, biosensors, imaging technology, and bio-hybrid devices for applications such as dynamic nanomachines, implantable devices, and drug delivery systems.

Appendix E. Definitions

Company headquartered in California

A company whose ultimate parent is headquartered in California.

Competitive Renewal proposal

Any proposed grant that is an extension of a research grant previously funded by the UC Discovery Grant program is considered a competitive renewal. Competitive Renewals are encouraged, but all grants are subject to a limit of four years of UC Discovery Grant funding. Applicants for Competitive Renewals must submit a progress and financial report for their previously funded grant as part of their proposal. Applicants are advised that a Competitive Renewal will not be considered for projects that have six months or more remaining in their previously funded project. Upon reviewing the proposal and previous grants, may change the status of a proposal from New to Competitive Renewal, when applicable.

Lawrence Berkeley National Laboratory Budget Considerations

Lab investigators are eligible to apply if they have PI status at a UC campus and must apply through that campus' Contract and Grants Office. When completing proposal budgets, lab investigators should note that UC Discovery Grants do not provide indirect costs (also referred to as overhead payments). When required by DOE policy, funds for those purposes may be obtained from:

- the Industry Sponsor, or
- a source identified by the Laboratory.

Lab administrators are required to provide in their proposal application a cover letter that explains the amounts and sources of all indirect cost payments. The letter must explicitly certify that all indirect and overhead costs that are not committed by the Industry Sponsor will be paid by other, specifically identified sources along an appropriate schedule.

Multi-campus proposal

A proposal demonstrating:

- research taking place on more than one UC campus;
- Principal Investigator and Co-Principal Investigators representing two or more UC campuses;
- budget expenditures on more than one UC campus; and
- one UC campus serving as the lead to submit the proposal, to distribute UCDG and Industry Sponsor funds through a subcontract to the other campus(es), and to ensure proper compliance with annual progress reporting requirements.

Multi-sponsor proposal

A proposal sponsored by more than one eligible Industry Sponsor. If one or more Industry Sponsors do not meet the eligibility criteria, the applicant may be provided the opportunity to adjust the proposed budget accordingly. For multi-sponsor proposals, guidelines regarding cash and/or in-kind contributions apply to the total contribution from all Industry Sponsors. Therefore, individual sponsors on a multi-sponsor proposal may choose to contribute cash only, in-kind only, or cash plus in-kind, as long as the total cash plus in-kind contribution from all participating sponsors meets the budget guidelines and all participating Industry Sponsors agree on the contribution structure. Substitution of sponsors is allowed if all other participating sponsors agree.

Multi-year proposal

A DRT proposal with a project period exceeding one year. DRT proposals are accepted with project periods ranging from one to four years. Investigators, whose Industry Sponsors are unable to commit for periods greater than one year should apply for one year grants and encourage the sponsor to support competitive renewal proposals in subsequent years. Projects will receive no more than four years of combined funding, either through a single four year proposal or a series of competitive renewals.

Resubmitted proposal

An unfunded proposal submitted to a previous Request for Proposals. In order to reapply, the applicant must provide a summary of the substantial additions, deletions, and changes that have been made since the previous submission. This summary must explicitly address questions and concerns raised by reviewers of the previous proposal.

Substitution or Addition of an Industry Sponsor

Substitution or addition of an Industry Sponsor to an existing grant during the project period is allowed, as long as the following conditions are met:

- An Industry Sponsor substitution may be considered annually for an ongoing project;
- All current Industry Sponsors of the grant agree to the substitution or addition;
- Adequate justification for the grant modification is provided, particularly if the substitution or addition of Industry Sponsors is combined with a supplemental funding request;
- All terms and policies are met (i.e. certification of amended research agreement);
- The new Industry Sponsor(s) satisfy the California eligibility requirement;
- The request does not exceed the limit on the number of times that a substitution or addition of an Industry Sponsor can occur for a particular grant (once per project year)