Chairs' & Center Directors' Meeting Minutes

Date: April 27, 2015 (12:00 to 2:00 pm)
Location: WCH – Room 443
Attendees: Abbaschian, Reza
Aguilar, Guillermo
Barth, Matt
Bhanu, Bir
Boretz, Mitch
Chrobak, Marek
Farrell, Jay
Garay, Javier
Haddon, Robert
Hartney, Pat
Matsumoto, Mark
Myung, Nosang
Najjar, Walid
Parker, Linda
Ravi
Wang, Albert

Absent: Balandin, Alex
Vafai, Kambiz
Venkatram, Akula

The agenda for the meeting is shown in Appendix 1.

1. Welcome and call for agenda items - Reza
Reza stated that he and Nosang recently returned from a trip to Korea and Japan. Nosang will provide a summary of the trip in his update. No items were added to the agenda.

2. Approval of Minutes – Pat
The minutes of the April 13th Chairs/Directors meeting were unanimously approved.

3. 25th Anniversary Celebration – Linda
Linda reported that only 14 BCOE faculty have rsvp'd for the 25th Anniversary Celebration on May 16th. She will send the names of these faculty to their respective Chairs so that the Chairs can encourage other department faculty to attend. Also, Linda will send to the Chairs/Directors names of corporate sponsors of the event that have seats available at their tables. Linda asked Chairs/Directors to provide names of faculty that should be seated at these tables. In addition to France Cordova, former Chancellor Ray Orbach and his wife will attend the event. Lastly, it was recommended that "black tie optional" information be sent to faculty and staff that will be attending this event.
Reza noted that William Ford, Jr. hasn't responded to our invitation to be this year's Commencement Speaker. The name of the Speaker needs to be provided to campus by May 1st.

4. Faculty Salary Increase – Reza

Reza handed out copies of an email from the Provost describing this year's faculty salary increase program. Each tenure-track faculty member will receive a 1.5% increase starting 7/1/15. An additional pool of funds (equal to 1.5% of faculty salary) will be available to each academic org to address individual faculty salary equity, compression or inversion problems and for exceptional merit. The Provost anticipates that about 15% of UCR's faculty will receive funding from this pool. Salary increases of 3-10% are expected from this pool. Reza asked Chairs to identify 25% of their faculty that could qualify for these additional funds. Mark stated that he participated in a UCR gender/ethnicity study a few years ago and that almost all salary differences were attributable to faculty discipline, college, initial off-scale amount and start date. Reza added that salary inversion doesn't appear to be an issue in BCOE but salary compression may be an issue. The basic problem is that base salaries are too low. UCI addressed this issue by using some of its unfilled faculty line funding to increase faculty salary scales. It was noted that unlike the faculty merit program, campus faculty will not participate in these faculty salary decisions and that the Academic Senate may have concerns with this process. Reza stated that Rhonda can provide Chairs with merit increase dates for faculty and other data. In response to a question, Reza stated that Chairs should use the order of the Provost's criteria (i.e., equity, compression, inversion and exceptional merit) for recommendations. It is uncertain when this information will be due to the Provost but Reza asked that faculty salary increase recommendations be sent to him by mid-May. If needed, this topic can be discussed at the next Chairs/Directors meeting on May 11th.

5. Department and Center Updates

ME: Guillermo reported that the three faculty cluster hire candidates are still interested in joining UCR. The ME faculty recently met to review the candidates for the joint faculty position with CEE.

UC Light: Albert stated that the agreement with SolarMax is in process.

CE-CERT: Matt reported that CE-CERT is preparing for its May Board of Advisors Meeting. Also, CE-CERT provided input to the County of Riverside's proposal to the ARB for relocation of its laboratory currently located in El Monte. Riverside and Pomona are the most likely locations for this facility.

CEE: Nosang reported that CEE faculty will be meeting today to review the candidates for the joint faculty position with ME. Also, he stated that he, Reza and the Chancellor were in a group that visited three universities: Hanyang University and the Korean Institute of Materials Science (KIMS) in Korea and Tohoku University in Japan. Reza added that Hanyang is interested in workshop collaborations with BCOE and that KIMS wants UCR to be a hub for collaborations with UC campuses. Reza also stated that Tohoku has state-of-art facilities including a four-story clean room. Tohoku's Disaster Institute, established after the 2011 earthquake and tsunami, could be used as a model for a similar institute at UCR.

CSE: Marek reported that one candidate has now accepted a faculty offer. This new faculty member's research area is software engineering. Another candidate's response is pending. The offers to the TOE candidates are still being worked on.

BIEN: Bir indicated that four faculty candidates were interviewed and that one candidate has been recommended by the search committee.

CNSE: Robert stated that Masa Rao is close to accepting his new tools in the MSE Clean Room. When operational, these tools will represent one of two such capabilities in the US.

MSE: Javier stated that a new, state-of-art TEM (Transmission Electron Microscope) has been ordered by campus to replace an outdated one.

ECE: Jay reported that two faculty have been hired this year (Wong and Ren). The response to an offer to a final candidate is due at the end of the week but this deadline may be extended.

6. Undergraduate Education – Ravi

Ravi called attention to the UC Admissions Picture attachment to the agenda. He noted that BCOE freshmen SIRs as of 4/27/15 numbered 322. In order to hit our 450 target, we may need to look at waitlisted applicants. However, there may be enough applicants that commit to BCOE by the 5/1 deadline so that using the waitlist may not be necessary. Also, Ravi stated that BCOE's policy regarding transfers from other UCR academic units is that they need to meet BCOE's current AIS minimum and be calculus and English comprehension ready. No objections were made to continuing this internal policy.

7. Graduate Education – Mark

Mark handed out the latest comparison of graduate student applications, admits, in-process, accepts, declines and targets between 2014 and 2015 by BCOE program. He noted that the total number of accepts this year is 103 compared to 143 at this time last year. This number represents less than 50% of our target. One reason for this low figure is that the number of offers processed through the Grad Division is 314 this year compared to 427 at this time last year. The Grad Division has lost staff and is prioritizing financial offers first. As such, many MS offers have not yet been processed. Also, Mark reported that BCOE fellowship offers are about $250K above this year's target funding level. One program's offers represent the bulk of this overage. As such, this program will need to provide departmental funds to cover the amount above its target. Otherwise, there won't be any contingency or bridge grad student funding available for any BCOE program.

8. NSF Graduate Research Fellowships – Mitch

Mitch stated that UCR's Grad Division will be offering a summer program again this year for students interested in applying for an NSF Graduate Research Fellowship. These Fellowships are available to 1st and 2nd year domestic PhD students. Mitch will send notifications of this summer program to all incoming domestic PhD students by the end of next week. Mitch called attention to the Myths and Facts sheet about this NSF Fellowship Program attached to the agenda. He asked Chairs/Directors to review this information and send him any comments and suggestions. Also, Mitch will be meeting with the NSF Graduate Student Fellowship Program Officer soon. Bir added that NSF seems to prefer funding a certain student profile and that we may want to develop a profile description. Mitch responded that this is an option but that students benefit from the writing and submittal process even if they don't get funded the first time.

9. Technology Commercialization – Jade Sche

Jade Sche and Michael Arciero gave a Powerpoint presentation on UCR's Office of Technology Commercialization. Comments from the Chairs/Directors included:

- Staff turnover in this Office has led to confusion and lack of timely input and response
- Since UCR hasn't finalized its internal policy on patent royalty distribution, faculty do not see much benefit in pursuing patents
- CAP doesn't consider patent information in their reviews of faculty files
- Departments need financial incentives to push faculty to pursue patents.

10. Other Matters

No other matters were discussed.

APPENDIX 1

UNIVERSITY OF CALIFORNIA
UC RIVERSIDE
BOURNS COLLEGE OF ENGINEERING

Chairs' & Center Directors' Meeting

April 27 2015

Agenda

Winston Chung Hall – Room 443

1.	Welcome - Request for Agenda Items from the Floor	Reza
2.	Approval of Minutes from April 13, 2015 Meeting	Pat
3.	25th Anniversary Celebration	Linda
4.	Faculty Salary Increase	Reza
5.	Department and Center Updates	
6.	Undergraduate Education	Ravi
7.	Graduate Education	Mark
8.	NSF Graduate Research Fellowships	Mitch
9.	Technology Commercialization	Jade Sche
10.	Other Matters	

Please note next meeting will be on: Monday, May 11, 2015

Future Meeting Dates

2014

~~Monday, July 7~~
~~Monday, August 11~~
~~Monday, September 8~~
~~Monday, September 22~~
~~Monday, October 6~~
~~*Wednesday*, October 22~~
~~Monday, November 3~~
~~Monday, November 17~~
~~Monday, December 1~~
~~Monday, December 15~~

2015

~~Monday, January 5~~
~~*Friday, January 23*~~
~~Monday, February 2~~
~~***Friday, February 20***~~
~~Monday, March 2~~
~~Friday, March 20~~
~~Monday, March 30~~
~~Monday, April 13~~
Monday, April 27
Monday, May 11
Friday, May 29
Monday, June 8
Monday, June 22
Monday, July 6
Monday, July 20

UG Admissions Picture, 4/27/15					SIR - Target	SIR - Projection
Major	Target	Admitted	Projection	SIRs		
BIEN	50	381	45	47	-3	2
BUNF	15	61	13	9	-6	-4
CEN	50	272	44	38	-12	-6
CHEN	50	245	45	36	-14	-9
ELEN	75	293	63	48	-27	-15
ENCS	55	504	59	37	-18	-22
ENEN	50	187	40	33	-17	-7
MCEN	85	488	79	65	-20	-14
MSE	20	63	16	9	-11	-7
BCOE	**450**	**2494**	**406**	**322**	**-128**	**-84**

27-Apr-15

APPLICATIONS

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	40	29	69	38	35	73	78	64	142
CEE	34	58	92	32	86	118	66	144	210
CEN	5	153	158	0	0	0	5	153	158
CPSC	39	658	697	33	223	256	72	881	953
ELEN	27	341	3341	31	198	229	58	539	597
MSOL	1	0	1	0	0	0	1	0	1
MSE	8	35	43	14	74	88	22	109	131
MCEN	26	56	82	11	65	76	37	121	158
BCOE	180	1330	1510	159	681	840	339	2011	2350

ADMITS

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	13	12	25	12	5	17	25	17	42
CEE	17	19	36	18	18	36	35	37	72
CEN	0	0	0	0	0	0	0	0	0
CPSC	16	10	26	17	47	64	33	57	90
ELEN	6	4	10	11	33	44	17	37	54
MSOL	0	0	0	0	0	0	0	0	0
MSE	2	3	5	6	7	13	8	10	18
MCEN	11	11	22	6	10	16	17	21	38
BCOE	65	59	124	70	120	190	135	179	314

IN PROCESS

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	5	6	11	2	3	5	7	9	16
CEE	0	4	4	0	1	1	0	5	5
CEN	2	15	17	0	0	0	2	15	17
CPSC	2	70	72	0	3	3	2	73	75
ELEN	4	55	59	0	7	7	4	62	66
MSOL	0	0	0	0	0	0	0	0	0
MSE	0	0	0	1	2	3	1	2	3
MCEN	1	5	6	0	2	2	1	7	8
BCOE	14	155	169	3	18	21	17	173	190

ACCEPTS

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	2	1	3	5	3	8	7	4	11
CEE	4	1	5	4	7	11	8	8	16
CEN	0	0	0	0	0	0	0	0	0
CPSC	7	0	7	5	18	23	12	18	30
ELEN	4	0	4	3	19	22	7	19	26
MSOL	0	0	0	0	0	0	0	0	0
MSE	1	1	2	4	3	7	5	4	9
MCEN	7	1	8	1	2	3	8	3	11
BCOE	25	4	29	22	52	74	47	56	103

DECLINES

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	3	3	6	5	2	7	8	5	13
CEE	7	6	13	12	10	22	19	16	35
CEN	0	0	0	0	0	0	0	0	0
CPSC	0	0	0	12	27	39	12	27	39
ELEN	1	1	2	5	9	14	6	10	16
MSOL	0	0	0	0	0	0	0	0	0
MSE	0	1	1	1	4	5	1	5	6
MCEN	0	1	1	3	0	3	3	1	4
BCOE	11	12	23	38	52	90	49	64	113

Targets

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	4	4	8	10	4	14	14	8	22
CEE	4	1	5	8	11	19	12	12	24
CEN	6	14	20	NA	NA	NA	6	14	20
CPSC	10	15	25	13	17	30	23	32	55
ELEN	7	23	30	7	23	30	14	46	60
MSOL	0	0	0	0	0	0	0	0	0
MSE	5	5	10	10	5	15	15	10	25
MCEN	8	4	12	8	4	12	16	8	24
BCOE	44	66	110	56	64	120	100	130	230

28-Apr-14

APPLICATIONS

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	33	32	65	43	38	81	76	70	146
CEE	29	45	74	37	96	133	66	141	207
CEN	6	68	74	0	0	0	6	68	74
CPSC	40	548	588	36	215	251	76	763	839
ELEN	27	373	400	24	227	251	51	600	651
MSOL	1	0	1	0	0	0	1	0	1
MSE	9	46	55	23	81	104	32	127	159
MCEN	28	71	99	28	63	91	56	134	190
BCOE	173	1183	1356	191	720	911	364	1903	2267

ADMITS

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	12	3	15	18	3	21	30	6	36
CEE	19	16	35	23	20	43	42	36	78
CEN	2	0	2	0	0	0	2	0	2
CPSC	12	72	84	15	40	55	27	112	139
ELEN	12	40	52	13	28	41	25	68	93
MSOL	0	0	0	0	0	0	0	0	0
MSE	5	5	10	16	4	20	21	9	30
MCEN	17	9	26	20	3	23	37	12	49
BCOE	79	145	224	105	98	203	184	243	427

IN PROCESS

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	0	1	1	1	1	2	1	2	3
CEE	0	4	4	0	6	6	0	10	10
CEN	0	3	3	0	0	0	0	3	3
CPSC	3	18	21	1	0	1	4	18	22
ELEN	0	3	3	3	27	30	3	30	33
MSOL	0	0	0	0	0	0	0	0	0
MSE	0	1	1	0	1	1	0	2	2
MCEN	0	3	3	0	2	2	0	5	5
BCOE	3	33	36	5	37	42	8	70	78

ACCEPTS

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	3	0	3	10	0	10	13	0	13
CEE	7	2	9	15	14	29	22	16	38
CEN	0	0	0	0	0	0	0	0	0
CPSC	6	3	9	6	12	18	12	15	27
ELEN	4	7	11	8	9	17	12	16	28
MSOL	0	0	0	0	0	0	0	0	0
MSE	2	0	2	11	3	14	13	3	16
MCEN	7	4	11	9	1	10	16	5	21
BCOE	29	16	45	59	39	98	88	55	143

DECLINES

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	5	0	5	7	2	9	12	2	14
CEE	10	6	16	8	6	14	18	12	30
CEN	0	0	0	0	0	0	0	0	0
CPSC	0	3	3	7	24	31	7	27	34
ELEN	5	3	8	3	10	13	8	13	21
MSOL	0	0	0	0	0	0	0	0	0
MSE	2	0	2	5	0	5	7	0	7
MCEN	5	2	7	7	0	7	12	2	14
BCOE	27	14	41	37	42	79	64	56	120

Targets

Program	MS			PHD			MS/PHD		
	Dom	Int'l	Total	Dom	Int'l	Total	Dom	Int'l	Total
BIEN	6	6	12	9	3	12	15	9	24
CEE	4	3	7	7	7	14	11	10	21
CEN	3	7	10	NA	NA	NA	3	7	10
CPSC	10	15	25	10	15	25	20	30	50
ELEN	5	20	25	5	20	25	10	40	50
MSOL	0	0	0	0	0	0	0	0	0
MSE	5	5	10	6	6	12	11	11	22
MCEN	13	0	13	10	1	11	23	1	24
BCOE	46	56	102	47	52	99	93	108	201

NSF Graduate Research Fellowship
Myths and Facts

UCR Graduate Division GradSuccess

Myth #1: Students should wait to apply until their second year of graduate school so that their applications will be stronger.

Fact: According to the NSF GRFP statistics, the most awards are given to graduating seniors, then slightly fewer are given to first-years, and still fewer are given to second-years.

First-year students are judged against other first-year students and second-year students are judged against other second-year students. Each year students apply, the applicant pool against which they are competing becomes stronger.

So, according to NSF statistics, students entering their first-year have a better chance of winning than those entering their second-year.

Myth #2: If a student does not have preliminary results or a concrete research plan for the next three years, s/he should not apply for the GRFP.

Fact: Students do not have to have preliminary results or be positive that the research they propose in the application is the research they will carry out over the next three years. The language of the NSF GRFP clearly states that they fund "individuals who show potential" for scientific achievements.

Instead of asking for a research proposal, they require a "research statement."

Therefore, they are not funding the project, but rather the individual. The research statement is an exercise to prove that the student has an understanding of research design and method and that they can develop an independent research project.

Myth #3: To demonstrate intellectual merit, students must show familiarity with many sources and use jargon conventional in his/her subfield.

Fact: The application should be easy-to-read and jargon free. The research statement is only two pages long, inclusive of graphics and citations.

While the student should show that they are conversant in the current research in the field, citing more than ~five sources may not leave space for a clearly articulated research plan.

Additionally, while the applications are read by scientists from the larger field, they may not be from the particular subfield. For example, the NSF GRFP says that a Chemistry likely panel arrangement might include scientists in the subfields of Chemistry of Life Processes, Environmental Chemical Systems, Sustainable Chemistry, and Chemical Synthesis.

This means that, to avoid reader fatigue, students should avoid jargon wherever possible while still demonstrating that they are knowledgeable about the field.

Myth #4: It is not worth reapplying if the application is turned down the first time.

Fact: Students can often develop a much stronger application after taking the reviewers' comments from their past applications into account. At UCR, we have seen many students who did not win awards in their first year win in their second year.

Myth #5: Only the students with the strongest academic records receive these awards.

Fact: The NSF GRFP is seeking individuals who will make a contribution to their fields and who will broaden opportunities for participation in science and engineering for underrepresented groups, including women, minorities, persons with disabilities, and veterans.

The NSF GRFP is really looking for those who will develop into scientific role-models. Therefore, students who have overcome obstacles or who have already demonstrated an interest in outreach can win over those with stronger records.

Through their essays, students must develop a compelling story about their past experience, their current research, and their future plans in order to demonstrate their potential to be scientific leaders to reviewers.

Myth #6: Intellectual merit and broader impacts correspond with different parts of the NSF GRFP application.

Fact: The most successful applicants will address both broader impacts and intellectual merit throughout both essays. Their letters of recommendation will also speak to these review criteria.

Myth #7: Students in Master's programs are not eligible.

Fact: Students in Master's or PhD programs in research fields are eligible to apply.

Myth #8: My letter of recommendation is not as important as the other parts of the application.

Fact: Your letter of recommendation is so important for students. If one recommender does not submit the letter on time, the student will not be considered for the award.

Your letter should address the student's intellectual merit and broader impacts. Students should be specific about why they are asking you to write for them and what they would like for you to address. Some things you might want to think about including are:

Intellectual merit:

1. Does this student work both independently and collaboratively?
2. For incoming students, why was this student accepted into the graduate program?
3. Has the student shown the ability to conceive of a research plan, develop a research question and hypothesis, anticipate results, or read and analyze literature in the field?
4. How do you imagine the student contributing to her/his field?

Broader impacts:

1. Does this student show potential for leadership?
2. Has this student participated in outreach activities?
3. Is the student interested in communicating science to a broader audience?
4. What are the "real world" implications of the student's research project?

This information has been compiled by Graduate Division for the use of Graduate Advisors and Faculty. All information has been taken from the following sources:

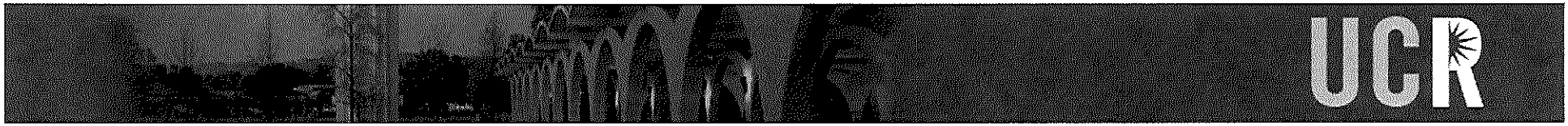
NSF GRFP Program 2013 Solicitation < http://www.nsf.gov/pubs/2013/nsf13584/nsf13584.pdf>
NSF GRFP website < http://www.nsfgrfp.org>
Principal Investigators Association. (2014, April 11). Webinar: *The NSF's Graduate Research Fellowship Program: What to Expect, How to Succeed.*

UNIVERSITY OF CALIFORNIA
UC RIVERSIDE

Technology Commercialization

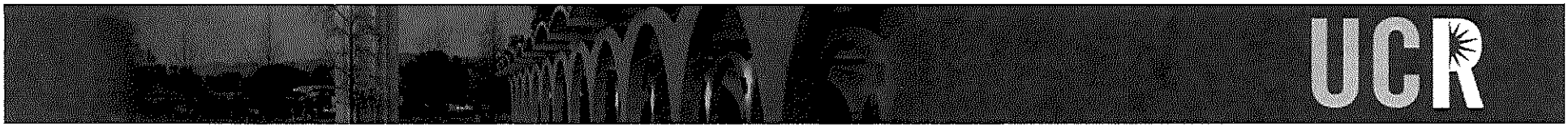
Jade Sche
Senior Licensing Officer

UNIVERSITY OF CALIFORNIA, RIVERSIDE



FEDERALLY FUNDED RESEARCH

- The US government funds technical research and development
  - To meet government needs for a technology solution to a problem
  - To assist in economic development by helping bring new technologies to the marketplace
  - To provide a return to the US taxpayer from the technology through:
    - Job creation in the US
    - Substantial manufacturing in the US
    - Net economic benefit to the US



FEDERALLY FUNDED RESEARCH

- The government wants to encourage use of new technologies in the marketplace
  - Terms of agreement encourage/expects technology owners to bring technologies to the marketplace
- The government wants to encourage further research and development
  - Intellectual property protection (e.g., patents and copyrights) permit technology owners to disclose their technologies without losing value in the marketplace

BAYH-DOLE ACT (1980)

- UC Riverside may elect to obtain title to inventions developed through federal funding
- Government retains non-exclusive license to practice the invention
- Government retains march-in rights
- Preferences to small businesses
- United States competitiveness requirement
- Substantial Manufacture in the United States
- Export Control regulations

PUBLIC BENEFIT IS A UC MISSION

- New discoveries can benefit the public ***if*** they can be effectively transferred to the public (i.e., commercialized)
- Public agencies such as research universities are not commercially oriented
- Commercialization by the private sector is frequently the ONLY way new discoveries from public agencies will be developed
  - Further investment in applied research and development from entrepreneurs and industrial/ corporate partners may be required

INVENTION DISCLOSURE

- Invention
  - Creation of a complete and operative idea
    - May be patentable
    - May still be valuable even if unpatentable as a trade secret that is maintained as confidential
- Inventorship
  - Must intellectually contributes to the enabling conception of at least one issued claim
  - Legal determination, different from authorship
- Disclosure and Record of Invention Form
    - http://research.ucr.edu/about/forms/technology-commercialization-forms.aspx

INTELLECTUAL PROPERTY (IP)

- IP exists in intangible creations of the human mind
  - Compare to real property such as real estate
  - Compare to personal property that is tangible
    - houses, cars, furniture, electronics, etc.
- Protectable forms of IP
  - Patents
  - Copyright
  - Trademarks
  - Trade Secrets
  - Mask Works

PATENTS

- An exclusive right, granted by the United States Patent and Trademark Office, an agency of the federal government
- For a limited term
  - 20 years from application filing date
- To exclude others from making, using, selling, offering to sell, and importing the claimed invention
- US compared to foreign patents
- No guarantee of freedom-to-operate

PATENTABLE SUBJECT MATTER

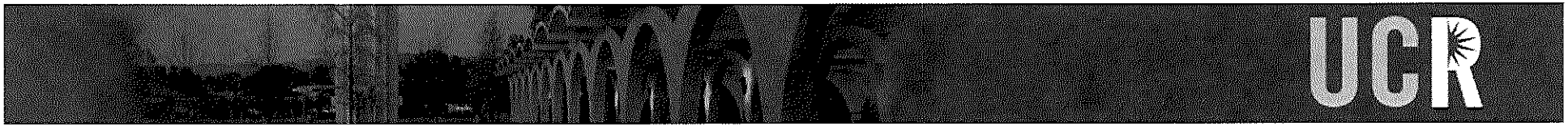
- Process
  - A method or a series of steps for producing a product or result
- Machine
  - An operable apparatus comprising a combination of elements
- Composition of Matter
  - A compound or a mixture of ingredients
- Article of Manufacture
  - An object, a manufactured object

PATENTABILITY REQUIREMENTS

- Novelty
  - Must be new, i.e., different from prior art
- Non-obviousness
  - Subject matter as a whole would not have been obvious at the time to person of ordinary skill in the art
- Usefulness
  - Must have some utility, not against public policy
- Full, enabling disclosure
  - Enablement and best mode requirements

TYPES OF PATENTS

- Utility Patent
  - Covers products and processes
  - Types of utility patent applications:
    - Provisional patent application
    - Non-provisional patent application
- Design Patent
  - Covers ornamental design
- Plant Patent
  - Covers asexually reproduced plants



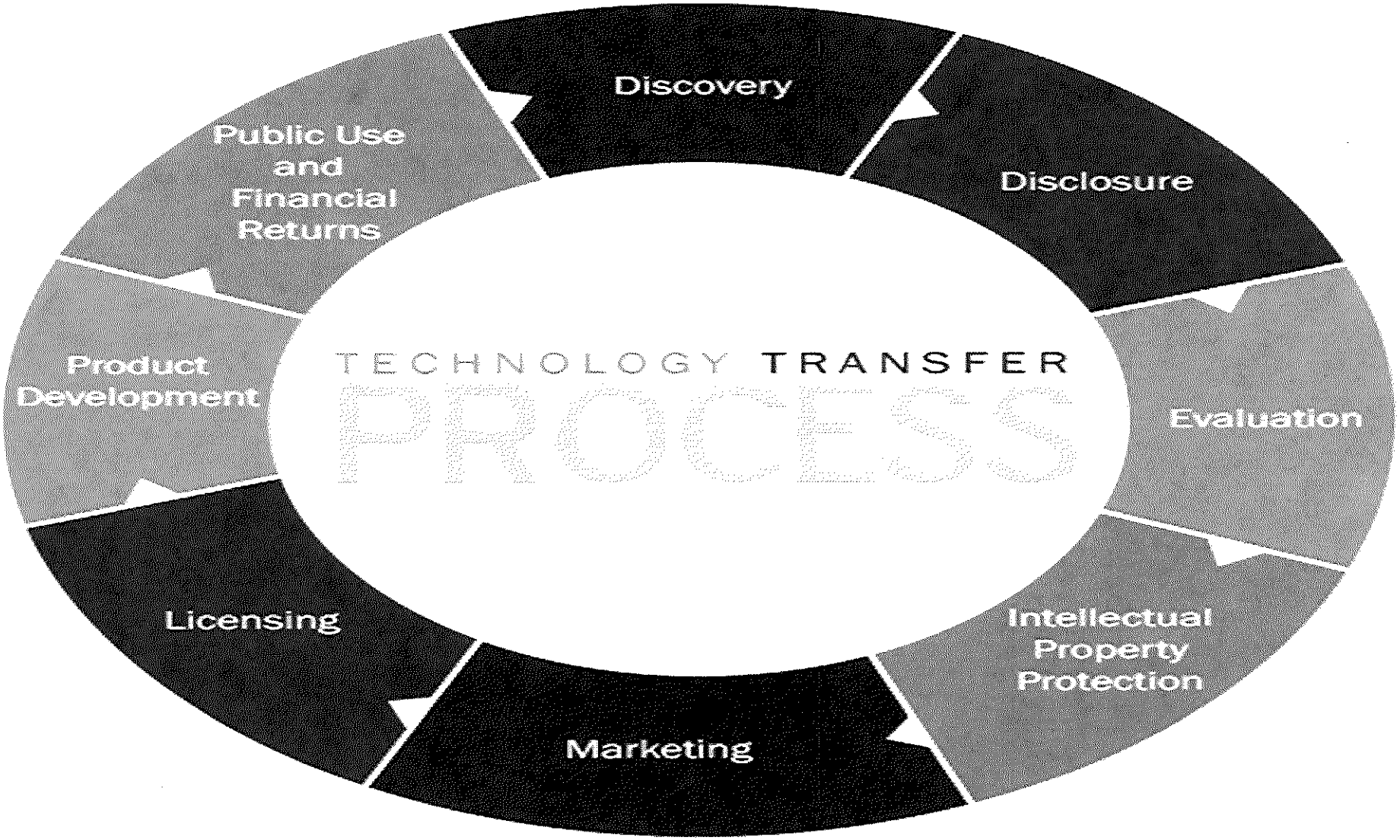
FILING, PROSECUTING, AND MAINTAINING PATENTS

- U.S. provisional - $450 ~ $1,450
- U.S. non-provisional - $10k ~ $15k
- U.S. Patent prosecution - $10k ~ $20k+
- Foreign patent costs – can be > $100k+
- Maintenance fees/annuity fees
- Timeline:
  - U.S. provisional abandoned after 12 months
  - U.S. non-provisional published after 18 months
  - Prosecution is usually between 2 – 4 years

COPYRIGHT

- Federal statutory right granted to every author of a literary or artistic work that is expressed in a tangible medium
  - e.g., text, music, video, computer code
- Protects the expression, not the content
- The right reserved to the author to exclude others from reproducing, modifying (derivative work), distributing, publicly performing and displaying the original work
- Registration

PROCESS OVERVIEW

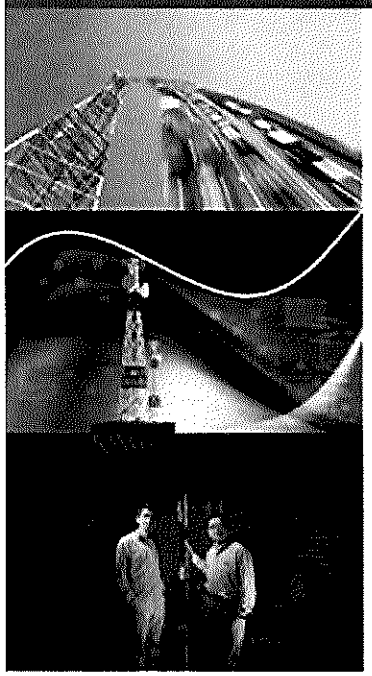


MARKETING NEW INVENTIONS

- Faculty inventors are usually an excellence source of potential licensees that may be interested in the technology invented
- Direct marketing to companies
  - Prior inquires from companies due to publication
  - Market research, business development, network
- Posting on UCR OTC website
- Posting on subscription websites
- Participation in conferences, trade shows, etc.

NON-CONFIDENTIAL DISCLOSURES

UCRIVERSIDE | Research and Economic Development



Interference Cancellation for Full Duplex Wireless Communication

Background:

The proliferation of smartphones and mobile devices have resulted in explosive growth and usage demand for data communication within an increasingly saturated wireless spectrum that has become prohibitively expensive to license. Contemporary wireless communication systems utilize half duplex operations to avoid cross interference. Full duplex communication has the potential to effectively double the data capacity of individual frequency channels.

Brief Description:

UCR researchers have developed a complementary set of technologies for Self-Interference Cancellation (SIC) that incorporates both frontend hardware and backend signal processing. It is based on a hybrid approach that is capable of mitigating all interferences and major sources of noise generated from the simultaneous transmission and reception of information on a single frequency channel to enable high performing full duplex wireless communication.

Advantages:

Double data capacity – enables simultaneous transmission and reception of information on a single frequency channel

Spectral efficiency – reduces spectrum fragmentation due to buffering between separate frequency channels

Handles real-time tuning – adaptive in the presence of unknown distortions functions, especially for digital filters

No requirement for phase-shift – enables the use of wide band signals instead of limited to narrow band signals

Readily applicable – can be applied to radio interference cancellation at cellular/vehicle base stations and specialized wireless technologies without standards modifications

Applications:

Wireless communication and signal processing for smartphones, computers, electronics, base stations

- ❑ Next generation cellular and wireless connectivity standards such as 5G and 802.11 for Wi-Fi, IoT
- ❑ Existing and specialized wireless technologies
- ❑ Multiple input and multiple output (MIMO) radios

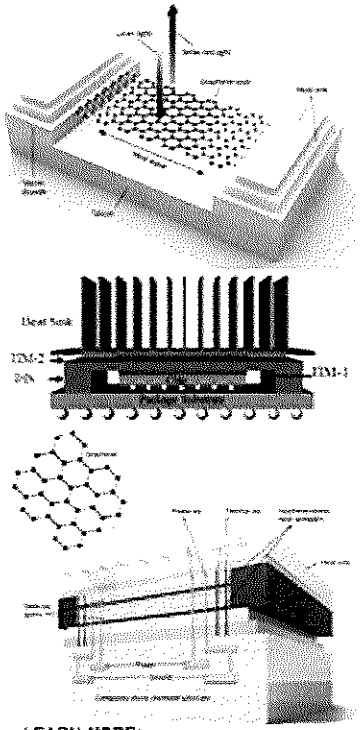
LEARN MORE:

Publications: A Method for Broadband Full-Duplex MIMO Radio – 10/12/2012
Breaking the Barrier of Transmission Noise in Full-Duplex Radio – 05/31/2013
(Multiple patents pending)

Keywords: Duplex, Wireless, Interference, Communication, Radio, MIMO, RF, Noise

Contact:
Jade Sohe, Senior Licensing Officer
jade.sohe@ucr.edu
UC Case No. 2011-465-2, 2013-668-0, 2013-901-0

UCRIVERSIDE | Research and Economic Development



Thermal Interface Material for Processor/Battery Heat Dissipation

Background:

Efficient heat removal has become critical for processors due to hot-spots from the rapidly increasing power densities as devices are miniaturized, systems are integrated, and circuit density is increased. Excess heat in electronics can degrade its performance, reduce operational lifetime and reliability. Application processors and batteries in mobile devices now also exacerbate overheating as an user experience issue that may lead to physical discomfort and injury as well as thermal throttling of performance.

Brief Description:

UCR researchers have developed a graphene enhanced Thermal Interface Material (TIM) and methods of its manufacturing and application that dramatically improves the thermal conductivity over conventionally used materials by an extra factor of 2 to 5 depending on the base material with values of 25 W/mK compared to ~1 to 5 W/mK. One particular formulation of the TIM with only 1% of graphene enhancement material has been demonstrated to reduce processor temperature by as much as 10°c.

Advantages:

Increased thermal conductivity – enables 10x increase in thermal conductivity compared to conventionally used TIM to improve heat dissipation from electronic components

Preserves desired viscosity and contact resistance – readily applicable and compatible with industry standards

Cost effective and scalable – low cost manufacturing process scalable and adaptive to any industrial application

Widely applicable – can be applied to a variety of devices, batteries, and systems that face the significant problem of self-heating and efficient removal of that heat

Applications:

Microprocessors, Application Processors, Batteries, 3D Integration, High-Speed Communication Devices

- ❑ CPU, integrated circuits, Communication circuits
- ❑ Smartphones, laptop computers, mobile devices
- ❑ Optoelectronics, Light Sources, Energy Storage Batteries, Compound Semiconductors

LEARN MORE:

Publications: Better Computing Through CPU Cooling – 09/29/2009
Multilayer Graphene Nanocomposites as Highly Efficient Thermal Interface Materials – 01/03/2012
(Multiple patents pending)

Keywords: Thermal Interface Material, Heat Dissipation, Graphene, Nano, Conductivity

Contact:
Jade Sohe, Senior Licensing Officer
jade.sohe@ucr.edu
UC Case No. 2013-156-2, 2013-224-0, 2013-612-0, 2014-245-0, 2014-246-0

NON-DISCLOSURE AGREEMENT

- Commonly referred as a NDA and may also be referred to as a secrecy/confidentiality/ confidential disclosure agreement (CDA)
- Agreement that protects each party with respect to confidential information
  - Grants the receiving party the right to use the information for a limited purpose
  - Obligates the receiving party not to disclose the confidential information or use it other than for the limited purpose stated in the agreement

LICENSING NEW INVENTIONS

- Technology, know-how, patents and other IP can be bought, sold, leased, or shared
- Licensing is a form of leasing the use of IP
  - Exclusive or non-exclusive
  - Geographic limitations
  - Fields-of-use limitations
  - Sublicensing rights
  - Alternatives to a license
    - Option agreement – limited rights, time-limited, lower cost, pre-negotiate the license/terms
    - Evaluation agreement – fewer rights, no cost

LICENSING CONSIDERATIONS

- Business plan for commercialization from the prospective licensee
- Bayh-Dole consideration for federal funding
- Start-up companies and/or industry partner
- Inventor issues – Conflict of Interest (COI), Political Reform Act, Conflict of Commitment
- Licensing and/or option agreement
- Diligence provisions

LICENSING FEES AND ROYALTY

- Reimbursement of patent costs
- Upfront licensing fees
- Royalties: apportion added-value
- Non-royalty considerations
- UC Royalty Policy – After recovery of patent legal expenses:
  - 35% of royalties to inventor(s)
  - 15% of royalties to support research at the UC
  - 50% to UC General Fund/Chancellor

ROLE OF THE OTC AT UCR

- An OPERATOR of UCR's contribution to the economic development of local community
- IMPLEMENTOR of the benefits of Technology Commercialization
- INTERFACE Research/Compliance/Market…
- RECONCILE academic/corporate cultures
- FACILITATE scholarly information sharing/ confidential information management

A COLLABORATIVE PROCESS

- OTC is **NOT** another bureaucratic layer!
- OTC represents the **University's interests**
  - Therefore ***all*** employee interests
- Contact OTC
  - At will!
  - **NOT** at the LAST MINUTE!
  - EACH time any AGREEMENT is needed!
  - EACH time any meeting with an outside *business*
  - party is needed!

THE OTC IS HERE TO HELP YOU…

- to **DISCLOSE** AND **PROTECT** an invention…
- to **MANAGE** your information…
- to **(e)valuate** your technology…
- to **assess** marketability…
- to **identify** potential commercial partners…
- to **negotiate** partnering agreements that represent your/UCR's best interests…
- to **start** an invention-related business…

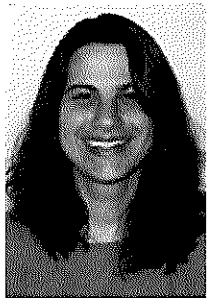
OTC CONTACTS:

Jade Sche
Senior Licensing Officer
Email: jade.sche@ucr.edu
Phone: (951) 827-4967
http://research.ucr.edu/otc.aspx

Material Transfer Agreements - MTAs

- MTAs with Academic and Non-Profit Institutions
  - Ms. Ursula Prins at (951) 827-4808 ormta@ucr.edu
- MTAs with For-Profit Entities (Industry)
  - Ms. Misty Madero at (951) 827-2210 ormta@ucr.edu

Judy Swineford
Office Administration
Email: judy.swineford@ucr.edu
P: 951-827-7941



Michael Arciero
Senior Licensing Officer
Email: michael.arciero@ucr.edu
P: (951) 827-4969

Richard Tun
Senior Licensing Officer
Email: richardt@ucr.edu
P: (951) 827-2212

THANK YOU FOR YOUR TIME AND ATTENTION.

Please feel free to ask questions, provide comments, and make suggestions. Your feedback is greatly appreciated.