A PRELIMINARY VIEW OF UNIVERSITY OF CALIFORNIA DATA ON DISCLOSURES, LICENSING AND PATENTING

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A Preliminary View of UC Data on Disclosures, Licensing and Patenting[1][2]

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This report explores the relationship of technology fields with patenting and licensing outcomes of academic invention disclosures. We explore a unique dataset on invention disclosures acquired by the University of California Office of Technology Transfer (UC-OTT) which covers information for 3,032 unique invention disclosures. The data run from July 1st 1992 to June 30th 1997, five fiscal years at UC.

There is a technology field in each invention disclosure. Unfortunately, it is filled for only1,917 of the 3,032 inventions. Even though this does not seem to introduce a severe selection problem[3] it does reduce our sample by one third for our analysis of the data by fields.

Most of the disclosed inventions with identified technology fields fall into three categories: Biological sciences (42.4% of 1,917), Medical (14.9% of 1,917) or Pharmaceutical (15.4% of 1,917)[4, 5]. Chemical inventions account for roughly 3.5%. Electronics, software,

[1] We are grateful to the University of California Executive Director of Innovation and Alliances and Services William Tucker for making this analysis possible, Director of Innovation Alliances and Patent Prosecution Patricia A. Cotton and Senior Analyst Vincent Cook for their assistance in the analysis reported in this note.

[2] A preliminary report requested by Dr. Steve Merrill of the National Academies for the Board on Science, Technology and Economic Policy, Committee on Management of Intellectual Property: Lessons from a Generation of Experience, Research and Dialogue.

[3] After discussions with UC-OTT personnel, we were informed that the technology field is being filled by the OTT manager, not the inventor. Given the amount of information the manager needs to fill out, the technology field may be neglected.

[4] Judging from the titles of invention disclosures, it appears to us that inventions assigned to the Pharmaceutical field are chemical compounds, biological molecules and drug targets, which are more directly related to certain therapeutic applications. Inventions in the Medical field are medical devices and inventions involved in medical procedures such as surgery. Inventions in Biological sciences are other inventions in biological and medical fields that are a little more remote from therapeutic applications.

[5] Some invention disclosures have more than one technology classification. 45 inventions have dual classifications of Pharmaceutical and Biological sciences. Their disclosure titles suggest that Pharmaceutical is the dominant classification for them, and we allocated them to the "Pharmaceutical" group. Similarly, 16 inventions have dual classifications of Medical and Biological sciences. Medical seems to be the dominant classification, and thus we placed them in the "Medical" group.

telecommunications and other inventions assigned to high tech technology fields together account for approximately 10-12% of the 1,917 inventions; all the classifications are displayed in Table 1. Note that the percentages displayed are over the entire sample of 3,032 invention disclosures.

Patent Prosecution and Technology Field

First, consider provisional (PRV) applications. For the sake of space, we discuss fields with a substantial number of inventions (i.e. greater than forty); for a comprehensive picture of all technology fields, Table 2 displays the likelihood of a PRV application for each technology class. We focus on invention disclosed after the GATT law change (June 7th, 1995), when provisional applications were established. For Biological inventions, the propensity to file a PRV application is 16.9% (61 of 362); for Chemical inventions15.2% (5 of 33); for Medical inventions 14.4% (15 of 104) and for Pharmaceutical inventions 32.1% (44 of 137).

The probability that these PRV applications become patent applications is approximately 80% overall (79.7% for Biological; 100% for Chemical; 85.7% for Medical; 72.5% for Pharmaceutical). The smallest probability is 41%, for Software. Over the entire sample period, Biological invention disclosures have an unconditional probability of 39.1% of resulting in full applications. For Chemical, Medical and Pharmaceutical the probabilities are 50%, 31.5%.and 43.2%, respectively.

Conditioned on a full application, Chemical inventions have the highest probability of being patented (that is, resulting in at least one patent) (88.6%). Note, however, the small sample size (35 inventions). Medical inventions have a probability of 82.2%, Biological 78.6% and Pharmaceutical 82%.The invention disclosures in the sample for which no technology class is assigned have patent grant rates similar to those of other disclosures, consistent with the assumption that occurrences of omission of the technology field information are random.

Licensing, Patents and Technology Field

Overall 643 invention disclosures have been licensed, at least initially. Interestingly177 of these inventions are not accompanied by a patent. We were informed by OTT personnel that this is a regularly utilized mode of technology transfer when licenses are non-exclusive. On the

other hand the overwhelming majority of inventions that were licensed with some form of exclusivity but without a final patent are inventions for which a patent application was filed, but for some reason the license was abandoned (in which case the patent application was abandoned) and/or the application failed or was abandoned (in which case the license was abandoned as well). Nonetheless, a more careful review of these agreements and their timing is warranted in order to comprehend the complexities of associated licensing and patenting practices.

Biological invention disclosures dominate those licensed without a patent, with 72 licensed disclosures in this category. Of the associated licenses, 25 were exclusive, 17 exclusive with limit and 30 (41.1%) non-exclusive.

For disclosures that are associated with a patent, data are presented in Table 4.Note that the observation unit here is a utility patent (we did not consider design or plant patents.). For Biological inventions, there are 273 patents (115 inventions) associated with some form of license. Of these, 64.5% (176) are associated with exclusive licenses; 18.7% (51) with licenses exclusive by field and 16.8% (46) non-exclusive. Of 39 licensed Chemical patents (16 disclosures), 94.9% (37) are exclusively licensed. Of 117 licensed Pharmaceutical patents (54 inventions), 59.8% (70) are licensed exclusively and 31.6% (37) licensed exclusively with limit. Of 39 licensed Medical patents (30 inventions), 74.7% (29) are licensed exclusively and 20.5% (29) licensed exclusively with limit.

Table 1. Invention Disclosures by Technology Class.

Technology Description	Technology Code	Number of Inventions	Percent
Factory automation eqp. and services	AUT	31	1.02
Products and services relating to biological sciences	BIO	814	26.84
Products and services related to chemical substances and processes	CHE	70	2.31
Computer systems, peripherals, accessories, and services	COM	42	1.39
Ground defense radar systems/eqp.	DEF	3	0.1
Eqp. and services relating to power generation	ENR	16	0.53
Eqp. and services for the analysis, protection and treatment of the environment	ENV	41	1.35
Systems and services for manufacturing high-tech products	MAN	24	0.79
Advanced material products and service	MAT	57	1.88
Eqp. and services for the medical industry	MED	286	9.43
Pharmaceutical products and services	PHA	296	9.76
Photonic products and services	PHO	59	1.95
Plant material	PLV	1	0.03
Software applications, systems, and services, middleware	SOF	56	1.85
Electrical, electronic, electromechanical or mechanical, equipment services	SUB	54	1.78
Test, measurement, control, scientific, and laboratory equipment and services	TAM	43	1.42
TAN	TAN	3	0.1
Telecommunications and internet services, Internet eqp., Web related services, Web related eqp.	TEL	14	0.46
Eqp. and services for the transportation industry	TRN	7	0.23
UNCLASSIFIED		1,115	36.77
Total		3,032	100

Table 2. Likelihood of a Provisional (PRV) Application by Technology Class. Inventions Reported that were Disclosed after June 7th 1995.

Tech Class	Number of Inventions	Number of Inventions Filed for PRV	Percentage of Inventions Filed for PRV
AUT	11	0	0.0
BIO	362	61	16.9
CHE	33	5	15.2
COM	11	0	0.0
ENR	10	3	30.0
ENV	10	0	0.0
MAN	9	4	44.4
MAT	26	6	23.1
MED	104	15	14.4
PHA	137	44	32.1
PHO	24	3	12.5
PLV	12	0	0.0
SOF	31	12	38.7
SUB	30	4	13.3
TAM	15	1	6.7
TAN	2	0	0.0
TEL	8	0	0.0
TRN	1	0	0.0
UNCLASSIFIED	622	113	18.2

Table 3. Patent Grant Conditional on Full Application.

Tech Class	**Number of Inventions Not Awarded a Patent**	**Number of Inventions awarded a patent**	**Percent of Patented Inventions**
AUT	0	9	100
BIO	68	250	78.6
CHE	4	31	88.6
COM	4	9	69.2
ENR	2	6	75
ENV	2	12	85.7
MAN	3	5	62.5
MAT	5	14	73.7
MED	16	74	82.2
PHA	23	105	82
PHO	5	21	80.8
SOF	1	16	94.1
SUB	9	17	65.4
TAM	3	8	72.7
TEL	0	2	100
TRN	0	3	100
UNCLASSIFIED	68	334	83.1
Total	213	916	81.1

Table 4. Patents Associated With Licenses.

	Number				Percentage			
License	Exclusive License	Exclusive License - With Limit	Non-Exclusive License	Total	Exclusive License	Exclusive License - With Limit	Non-Exclusive License	Total
AUT	4	0	1	5	80	0	20	100
BIO	176	51	46	273	64.5	18.7	16.8	100
CHE	37	1	1	39	94.9	2.6	2.6	100
COM	12	0	0	12	100	0	0	100
ENR	4	0	1	5	80	0	20	100
ENV	3	5	0	8	37.5	62.5	0	100
MAN	1	0	0	1	100	0	0	100
MAT	4	0	0	4	100	0	0	100
MED	29	8	2	39	74.4	20.5	5.1	100
PHA	70	37	10	117	59.8	31.6	8.5	100
PHO	17	6	0	23	73.9	26.1	0	100
SOF	7	0	2	9	77.8	0	22.2	100
SUB	12	0	0	12	100	0	0	100
TAM	3	0	0	3	100	0	0	100
TEL	1	2	0	3	33.3	66.7	0	100
TRN	1	0	0	1	100	0	0	100
UNCLASSIFIED	150	134	76	360	41.7	37.2	21.1	100
Total	531	244	139	914	58.1	26.7	15.2	100