

Advance-CTR Translational Research Seminar Series



Intro to Patents

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Intro to Patents

- Key Patent Facts:
 - contract theory: the Government gives an inventor a period (20 years from the filing date) of exclusivity in exchange for full disclosure of the invention to the public (“quid pro quo”)
 - negative right: a patent gives the right to exclude all others from making, using, offering for sale, selling, or importing
 - does NOT give a right to make or sell a product
 - can be dominated by a broader patent

Types of Patent filings

- Provisional Patent Applications:

- benefits:*

- can be very informal (does not require claims or inventor signature)
 - allows for continued technology development
 - additional year of patent term

- limitations:*

- must convert both U.S. and foreign apps in 12 months
 - only a placeholder; will not publish or be examined
 - must meet enablement requirements

- Non-provisional (or Utility) Patent Applications – examined by USPTO
- Patent Cooperation Treaty (PCT) Patent Applications - International!

What is Patentable?

- “Anything under the sun made by the hands of man”
 - new chemical compounds, *e.g.*, drugs, pesticides
 - methods of producing new compounds
 - new uses for old compounds
 - purified natural materials, *e.g.*, DNA, enzymes
 - transgenic animals or plants
 - new formulations or mixtures, *e.g.*, alloys, shampoos

What is NOT Patentable?



What is NOT Patentable?



GRAVITY

Just a theory

Laws of nature,
physical
phenomena,
and abstract
ideas are not
patentable

3 Criteria for Receiving a Patent

1) Utility

- demonstrated or proposed use that one of “ordinary skill in the art” would believe provides identifiable benefit and is capable of doing so

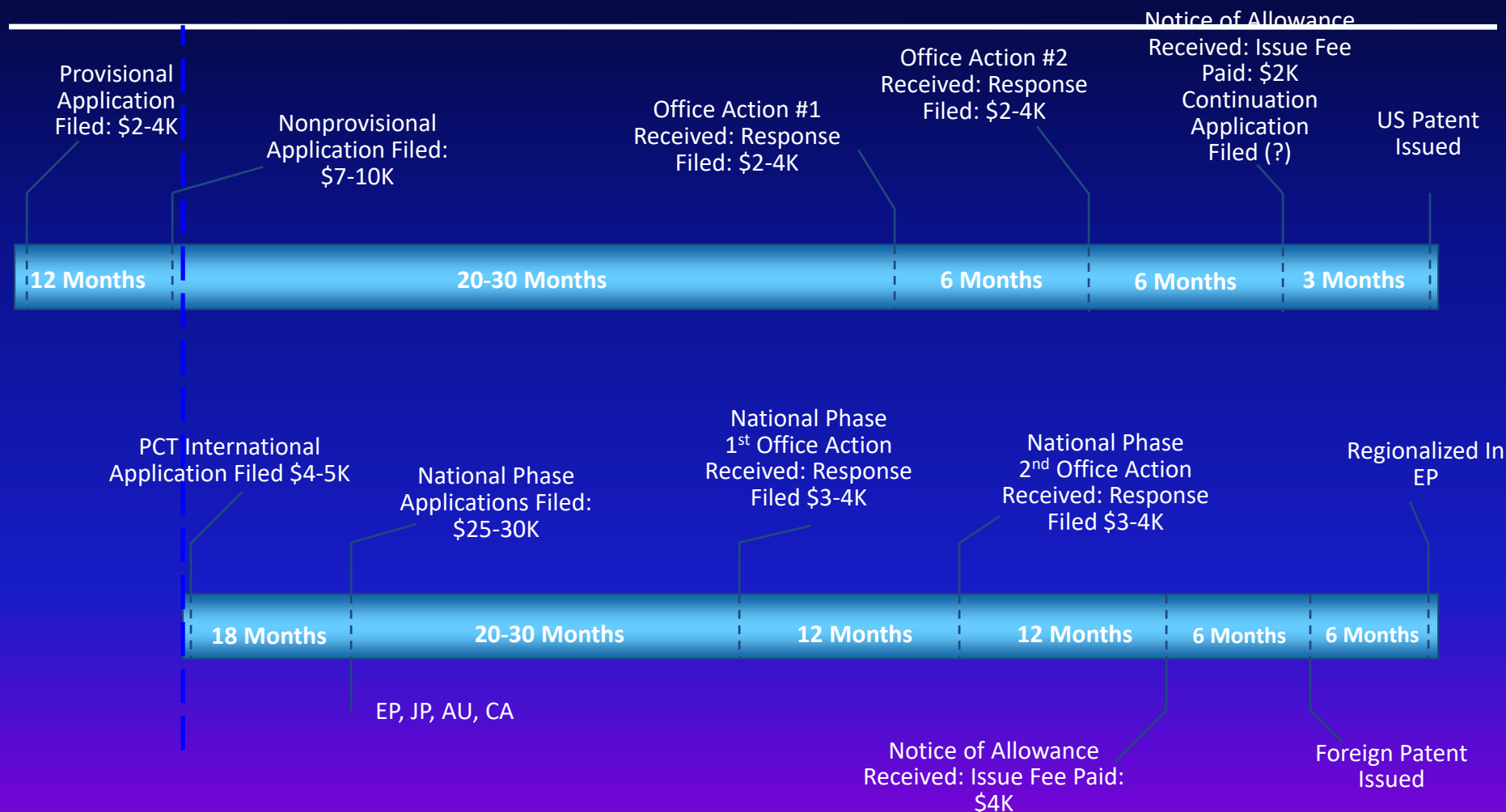
2) Novelty

- not patented, described in a single printed publication, or in public use, on sale, or otherwise available to the public before the effective filing date of the invention

3) Non-obviousness

- whether one skilled in the art at the time of the invention would have had a rational basis to combine prior art to reach the claimed invention with a reasonable expectation of success

Patent Prosecution Timeline



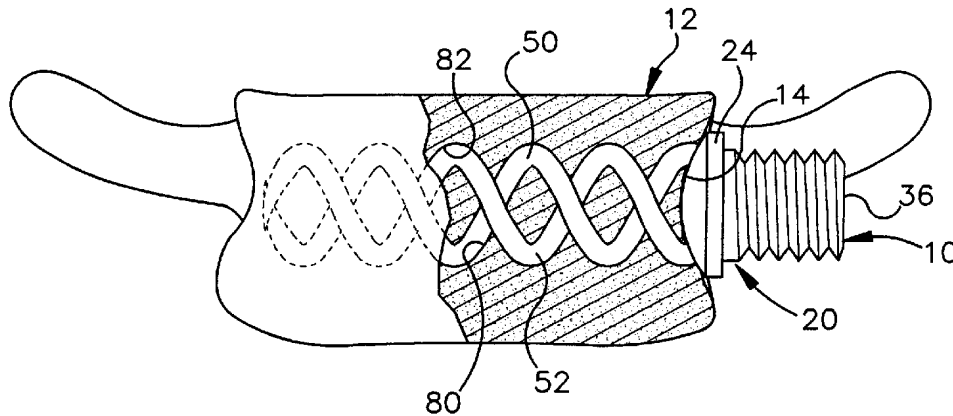
Examples of patents by technology type

(Medical) Device Patent

(12) **United States Patent**
Lieberman

(10) Patent No.: **US 6,551,322 B1**
(45) Date of Patent: ***Apr. 22, 2003**

(54) **APPARATUS FOR IMPLANTATION INTO BONE**



Having described the invention, I claim:

1. An apparatus for implantation into a bone in a patient's spine or pelvis, said apparatus, when implanted, being resistant to toggling in the bone and to being pulled from the bone, said apparatus comprising:

a platform having a first surface for facing a bone in a patient's spine or pelvis, said first surface being solid and extending generally transverse to a longitudinal axis of said apparatus, said platform including structure for connection to a spinal fixation implant; and

at least one helical spike for embedding into the bone upon rotation of said platform, said at least one helical spike projecting tangentially from said first surface of said platform and extending around said longitudinal axis, said at least one helical spike having a proximal end and a distal end;

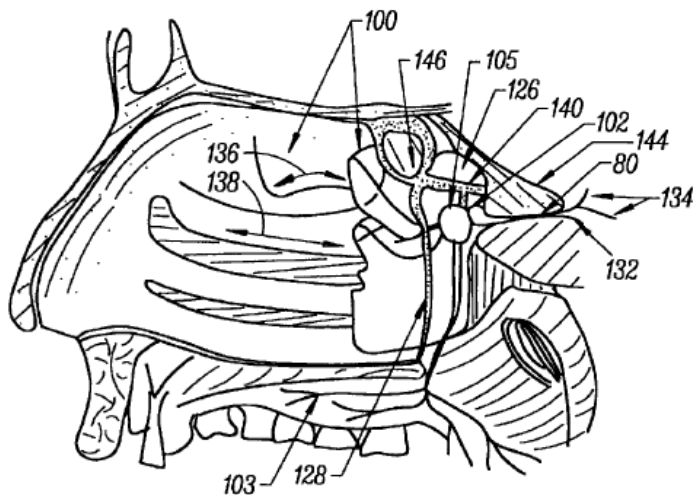
said at least one helical spike including a tip portion at said distal end which penetrates into the bone as said platform is rotated, a connecting portion at said proximal end connected to said first surface of said platform, and an intermediate portion extending between said connecting portion and said tip portion.

Medical Method Patent

(12) **United States Patent**
Ansarinia

(10) **Patent No.:** **US 6,526,318 B1**
(45) **Date of Patent:** **Feb. 25, 2003**

(54) **STIMULATION METHOD FOR THE SPHENOPALATINE GANGLIA, SPHENOPALATINE NERVE, OR VIDIAN NERVE FOR TREATMENT OF MEDICAL CONDITIONS**



It is claimed:

1. A method for suppressing or preventing pain, movement disorders, epilepsy, cerebrovascular diseases, autoimmune diseases, sleep disorders, autonomic disorders, urinary bladder disorders, abnormal metabolic states, disorders of the muscular system, and/or neuropsychiatric disorders in a patient, the method comprising:

positioning at least one electrode on or proximate to at least one of the patient's sphenopalatine ganglia, sphenopalatine nerves, or vidian nerves;

activating the at least one electrode to apply an electrical signal to at least one of the sphenopalatine ganglia, sphenopalatine nerves, or vidian nerves, the electrical signal generating heat insufficient to cause a lesion on the at least one of the sphenopalatine ganglia, sphenopalatine nerves, or vidian nerves.

Diagnostic Patent

(12) **United States Patent**
Hazen et al.

(10) **Patent No.:** **US 9,612,242 B2**
(45) **Date of Patent:** ***Apr. 4, 2017**

(54) **COMBINED F2-ISOPROSTANE AND
MYLEOPEROXIDASE DETECTION, A RISK
INDICATOR FOR CARDIOVASCULAR
DISEASE**

What is claimed is:

1. A method for detecting MPO activity and/or mass and F2-isoprostane levels comprising:
 - a) providing:
 - i) a first assay for determining the level of MPO activity and/or MPO mass in a bodily sample from a human subject, wherein said first assay employs an anti-MPO antibody; and
 - ii) a second assay for determining a level of an MPO-generated oxidation product from said bodily sample, wherein said MPO-generated oxidation product comprises F2-isoprostane (F2-iso); and
 - b) performing said first and second assays to obtain an MPO activity and/or mass level and an F2-isoprostane level from said bodily sample, wherein said bodily sample is selected from plasma, serum, urine, or blood.

Therapeutic Patent

(12) **United States Patent**
Li et al.

(10) **Patent No.:** **US 9,611,295 B2**
(45) **Date of Patent:** **Apr. 4, 2017**

(54) **TREATMENT OF IL-17 MEDIATED DISEASE
BY BLOCKING SEFIR-SEFIR
INTERACTIONS**

What is claimed is:

1. A decoy peptide consisting of less than about 50 amino acids substantially homologous to at least a portion of the amino acid sequence of the α C helix region of the SEFIR domain of Act 1 and comprising the amino acid sequence HGLHXKY (SEQ ID NO: 1), wherein the decoy peptide competitively inhibits the binding of interleukin-17 receptor (IL-17R) to adaptor protein nuclear factor κ B activator 1 (Act 1).

8. A method of treating an interleukin-17 (IL-17) mediated disease in a subject, comprising administering to the subject having the interleukin-17 mediated disease a therapeutically effective amount of the decoy peptide of claim 1.

Software Patent

(12) **United States Patent**
Sasidhar

(10) **Patent No.:** **US 9,384,322 B2**
(45) **Date of Patent:** **Jul. 5, 2016**

What is claimed is:

1. A computer-implemented method, comprising:
acquiring data from at least one data source, the acquired data including health data comprising a plurality of data objects for at least one patient, wherein the at least one data source comprises an electronic health record repository;
transforming the acquired data into episode model data according to a context-specific data model and storing the episode model data in a database for an episode of care corresponding to a set of health care services for the at least one patient;
generating at least one inverted index document for at least a portion of an episode for the patient based on the episode model data, the generating comprising:
determining a qualified name for selected data objects in the episode model data according to the context-specific data model, the qualified name comprising at least two of a temporal identifier specifying one of a plurality of time segments for the episode of care in which each of the selected data objects has been determined to reside, a field name providing a descriptor to represent information content for each of the selected data objects, and a data type indicating a predefined characteristic for data values stored in each of the selected data objects; and

(54) **STORING STRUCTURED AND
UNSTRUCTURED CLINICAL INFORMATION
FOR INFORMATION RETRIEVAL**

→ adding the qualified name to each of the selected data objects in the inverted index document according to a schema; and
constructing a query request to search the at least one inverted index document, the query request comprising search terms corresponding to at least one of the temporal parameter, the field name, and the data type of the qualified name associated with at least one of the selected data objects; and
providing results data from the at least one inverted index in response to searching based on the query request, whereby the time to retrieve data from the electronic health record repository is reduced.

Imaging Patent

(12) **United States Patent**
Machado

(10) **Patent No.:** **US 9,672,622 B2**
(45) **Date of Patent:** **Jun. 6, 2017**

(54) **IMAGE FUSION WITH AUTOMATED
COMPENSATION FOR BRAIN
DEFORMATION**

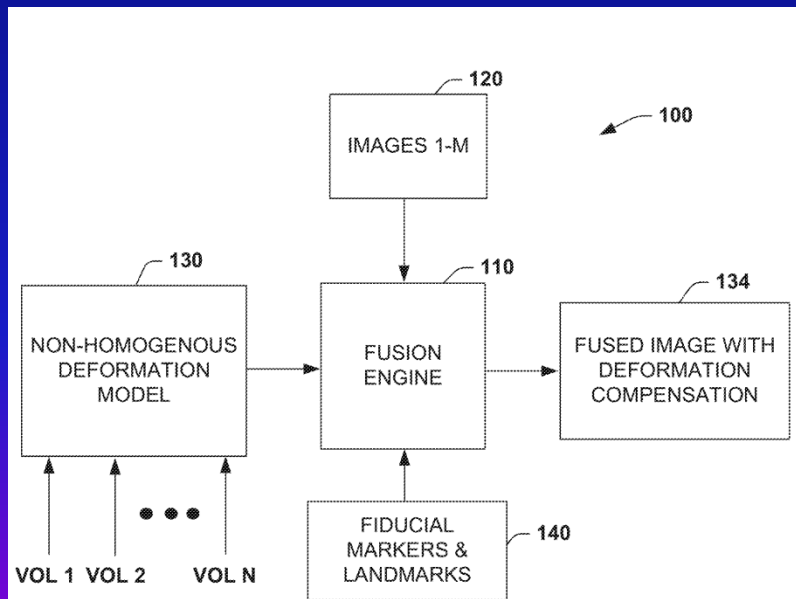


FIG. 1

What is claimed is:

1. A method comprising:

retrieving a first image of an anatomic region and a second image of the anatomic region from a non-transitory memory;

aligning the first image and the second image to generate a rigidly aligned image;

registering the first image to the rigidly aligned image;

generating a vector field mapping based on the registration of the first image to the rigidly aligned image to provide displacement data describing displacement between the first image and the second image; and

providing feedback to a user based on the vector field mapping,

wherein the feedback indicates at least one of:

a compensation distance or a trajectory required to target a specific preoperatively identified structure; or

a prediction of an equilibrium location of a structure identified intraoperatively or postoperatively.

Brown Biomedical Innovations to Impact

Introduction to Academic Biomedical Accelerator

Karen Bullock PhD, Managing Director

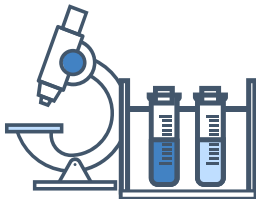
March 10, 2022

So, you have an idea/patent for a
biomedical product.

Now what?

The Idea-to-Impact Gap

NIH-funded basic research



*Academic
Accelerators:
Bridge the Gap*



Industry/Commercialization

BBII Program Goals

Launched in 2018 with ~\$8M in philanthropic gifts

- Encourage and enable a culture of biomedical entrepreneurship at Brown
- Support translating basic research discoveries into products with commercial potential
 - Provide consulting and advice on technology/product development
 - Provide funding for well-defined, product-focused proposals
 - Move products along the path to commercialization

Brown Biomedical Innovation to Impact



- | | | | |
|---|--|---|---|
| <ul style="list-style-type: none">• Feedback from external reviewers | <ul style="list-style-type: none">• Competitive proposal process | <ul style="list-style-type: none">• Milestones defined | <ul style="list-style-type: none">• BBII collaborates with Brown Tech Innovations |
| <ul style="list-style-type: none">• Programming in technology development | <ul style="list-style-type: none">• Product focused with \$100K for one year | <ul style="list-style-type: none">• Funding paid in tranches• Consultants and CROs | <ul style="list-style-type: none">• Connect with industry, venture capital and start-up resources and entrepreneurs |

What makes a competitive proposal?

- Great science and technical merit

AND

- Unmet need: What is the problem?
- Technology/product: How will your technology solve the problem?
- Commercial market
- Intellectual property
- Early development plan

BBII Eligibility

- Faculty whose principal appointment is at Brown University (covered by the Brown University IP policy)
- Investigators at Lifespan or Care New England with Brown faculty appointments

Want to learn more?

**Please connect:
karen_bullock@brown.edu**



Academic Technology Commercialization

Neil Veloso
Executive Director
Brown Technology Innovations





Agenda

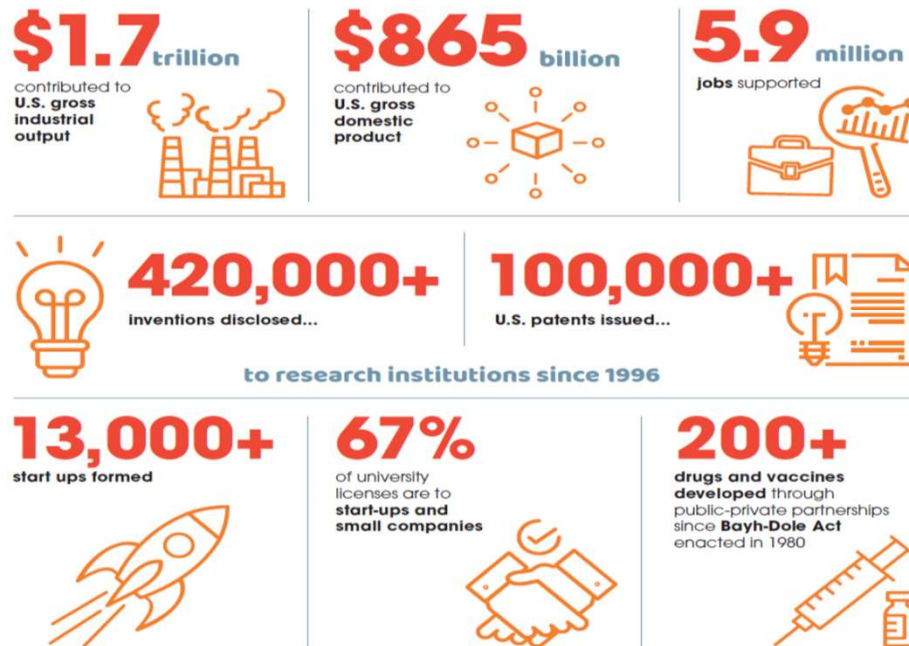
- ☐ Academic Technology Transfer
- ☐ Licensing and Faculty Startups

Academic Technology Transfer

Driving the Innovation Economy

Academic Technology Transfer In Numbers

From 1996 to 2017, up to...



Formalized with the passage of
federal Bayh-Dole Act (1980)

TTO models:
A university department

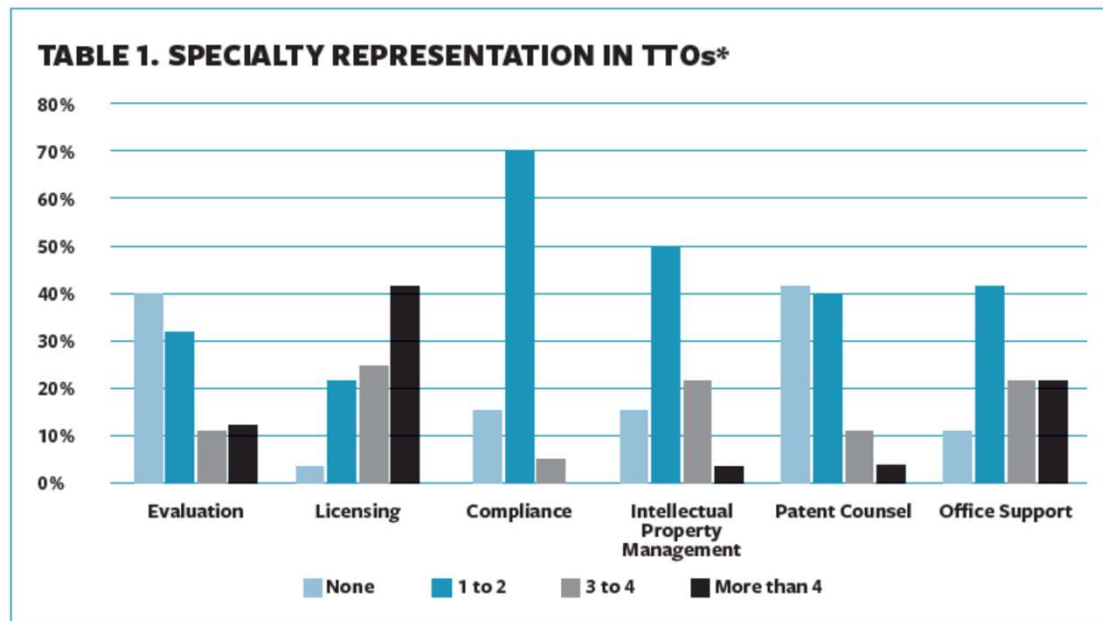
A standalone foundation

Technology transfer office structure

Multiple functions within a TTO.

Horizontal vs Vertical Office Structure

Primary focus area is “licensing.”



A Focus on Startups

TTOs have shifted towards licensing to startups vs. established companies.

“University Based Venture Funds” are sexy but not the norm.

Incubator and entrepreneurship programs have grown.

Product Development Focused research funding fits within the academic workflow.

TABLE 9. BARRIERS TO COMPLETING MORE PROJECTS*

Lack of entrepreneurship among faculty	49%
Academic resistance to commercialization efforts	26%
Lack of internal IP/legal support	11%
Physical space	6%
Lack of continuing education on developments in IP law	6%
Other	2%

FIGURE 10. INCUBATION RESOURCES ON CAMPUS*

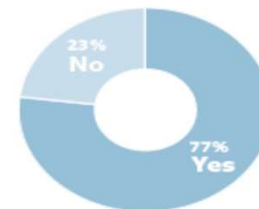
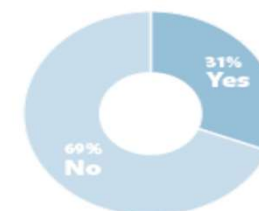


FIGURE 11. INVEST IN COMMERCIAL PROGRAM SPINOUTS*





Licensing/Options

- Patents
 - Accessing patented product?
 - A license?
 - Types of license agreements:
-
- Option

Not Products

Licensing

Covenant not to sue.

Exclusive License

Non-exclusive License

Exclusive right to negotiate

Anatomy of a License Agreement







The Licenser grants the Licensee:

- The ability to make, have made, use, sell or offer to sell Products from the Patent.
- The ability to sublicense.
- The ability to pursue infringers.

In exchange for these rights, the Licensee:

- Pays the licenser upfront, milestone and downstream royalties on product income, sublicense fees and infringement awards.
- Continues prosecution of the patents (usually in licenser's name).
- Reports on the progress of product development and sales.
- Indemnifies the Licenser against liabilities.

Commercialization Growth around Faculty Innovation

Faculty Startups			
	Sedivy		Fallon
Elkurt	Elias, Kurtis		Walsh
	Silverman		Stein
	Rose-Petruck	More to come!	



Thank you!

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