Intellectual Property and UW Technology Transfer

Patrick Shelby, PhD
Technology Manager

October 26, 2010

CENTER FOR COMMERCIALIZATION
UNIVERSITY *of* WASHINGTON

Topics

- Introduction to IP
- The invention process at UW
- Anatomy of a patent
- The Invention Disclosure process at UW
- The role of UW Center for Commercialization (C4C)

CENTER FOR COMMERCIALIZATION
UNIVERSITY *of* WASHINGTON

What is “Intellectual Property”

- Intellectual Property (USC Title 35 – patents, Title 17 - copyrights)
- Legal property right over creations of the mind
- Owners grated certain exclusive rights to their IP
- UW IP Policy: Chapter 7, Sections 1 & 2

Forms of Intellectual Property

- **Patent** – gives the right to exclude others from practicing an invention
- **Trademark** – identifies a unique source of goods or services
- **Copyright** – protects from copying of original works
- **Trade Secret** – protection by virtue of secrecy

Invention

Two elements of any invention:

- <u>Conception</u> – an idea that is complete enough to allow the invention to be reproduced by others
- <u>Reduction to practice</u> – occurs when the invention has been made or practiced

Intellectual Property Protection

- Establishes ownership of innovation
- Provides the right to exclude others from using the innovation without a license
- Creates value to transfer to others
- Provides incentive for investment in product development

Patentability Criteria

- **Novel**
  - New -- not previously patented, published, or publicly disclosed
- **Useful**
  - Serves a purpose or has a use function (marketable)
- **Non-obvious** (KSR vs. Teleflex)
  - Not obvious to one of ordinary skill in the art at the time the invention was made
- **Enablement**
  - Must teach how to make and use the invention
- **Best Mode**
  - Must describe the 'preferred embodiment' of the invention

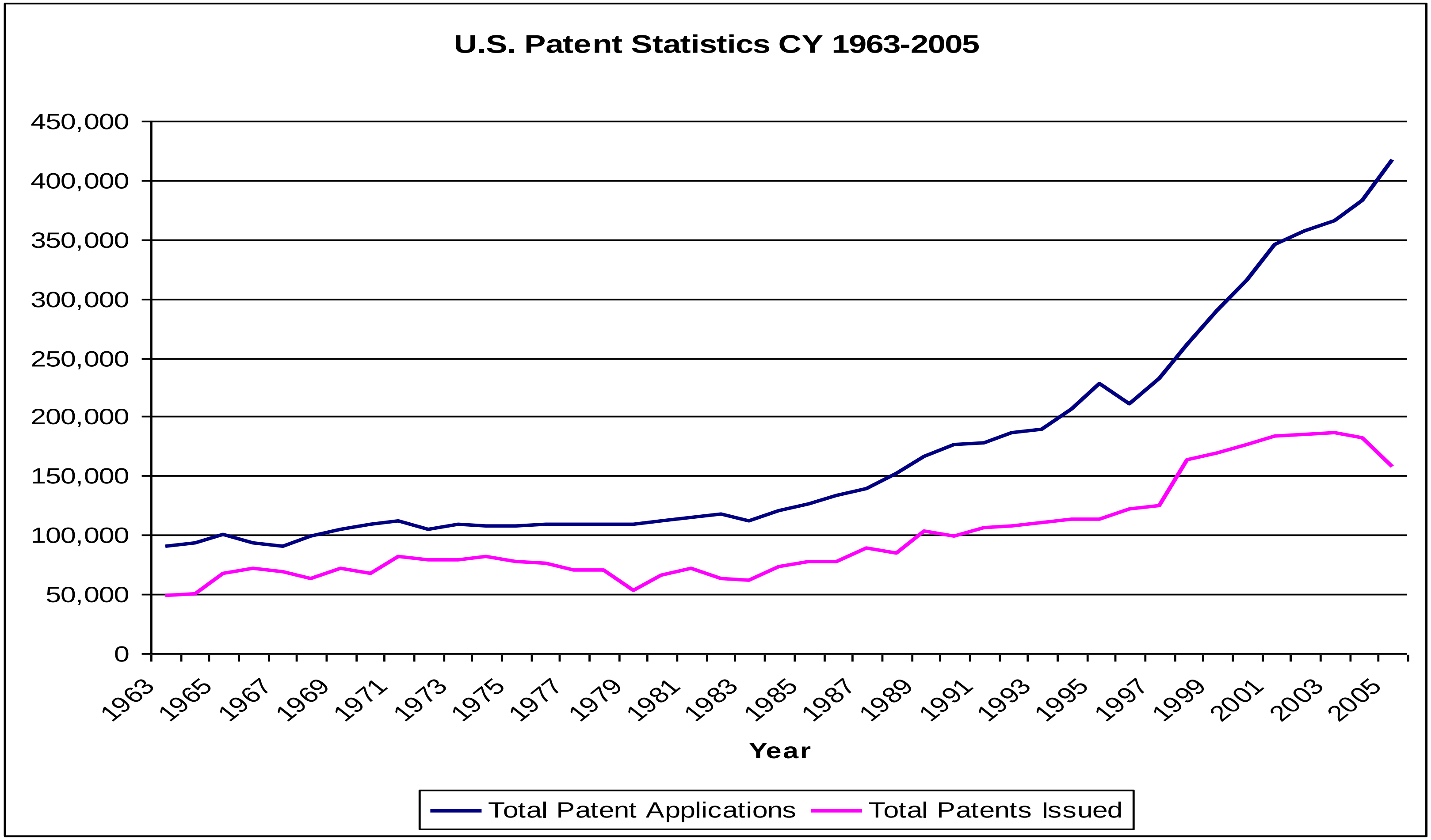
Cost of IP Protection

- Copyright -- $30 to register
- Trademark
  - US: $2,000-5,000
  - Major foreign countries: $2,000 -- $5,000
- Patent
  - US Provisional: $1000 -- $10,000
  - US Utility: $10,000 -- $20,000
  - Major foreign countries: $50,000 -- $100,000+

Patenting Timeframe

- Provisional
  - Granted 'upon application'
- Non-provisional
  - Application to issued patent: 4 years (average)
  - Depends on technology class (e.g., 'cancer' applications issue in as few as 2 years)
- Accelerated Examination – goal: 1 year
  - Applicant responsible for prior art search
  - Limited claims, limited appeals
  - Novelty, usefulness & non-obviousness must be demonstrated in application

US patents filed vs. issued



CENTER FOR COMMERCIALIZATION
UNIVERSITY *of* WASHINGTON

Anatomy of a patent

- Title page, including inventors & assignment
- Abstract
- Background, including prior art
- Summary of the invention
- Drawings, including a brief description
- Detailed description
- Claims
  - Independent
  - Dependent

US005684055A

United States Patent [19]

Kumar et al.

[11] **Patent Number: 5,684,055**

[45] **Date of Patent: Nov. 4, 1997**

[54] **SEMI-CONTINUOUS PRODUCTION OF SOLID STATE POLYMERIC FOAMS**

[75] Inventors: **Vipin Kumar**, Seattle, Wash.; **Henry G. Schirmer**, Spartanburg, S.C.

[73] Assignee: **University of Washington**

[21] Appl. No.: **354,960**

[22] Filed: **Dec. 13, 1994**

[51] **Int. Cl.**[6] **C08J 9/00**

[52] **U.S. Cl.** **521/79**; 521/146; 521/180; 521/182; 264/45.3; 264/50; 264/176.1; 264/234; 264/237; 264/345; 264/348; 264/DIG. 13; 264/DIG. 83

[58] **Field of Search** .... 521/79, 146, 180, 521/182; 264/45.3, 50, 176.1, 234, 237, 345, 348, DIG. 13, DIG. 83

[56] **References Cited**

U.S. PATENT DOCUMENTS

4,456,571	6/1984	Johnson	264/45.5
4,473,665	9/1984	Martini-Vvedensky et al.	521/79
4,761,256	8/1988	Hardenbrook et al.	264/45.5
5,158,986	10/1992	Cha et al.	521/82
5,182,307	1/1993	Kumar	521/51
5,223,545	6/1993	Kumar	521/51
5,334,356	8/1994	Baldwin et al.	522/133

OTHER PUBLICATIONS

Vipin Kumar, *Microcellular Polymers: Novel Materials for the 21st Century*, Progress in Rubber and Plastics Technology, vol. 9, No. 1, pp. 54–70 (1993).
Chul B. Park et al., *Extrusion of Microcellular Filament: A Case Study of Axiomatic Design*, Cellular Polymers, MD–vol. 38, pp. 69–91, ASME 1992.
Vieth, Wolf R., *Diffusion In and Through Polymers*, Hanser Publishers (1991) Ch. 3.1, at p. 52.

Primary Examiner—James J. Seidleck
Assistant Examiner—Duc Truong
Attorney, Agent, or Firm—William J. McNichol, Jr.

[57] **ABSTRACT**

The present invention provides a method for the semi-continuous production of microcellular foam articles. In a preferred embodiment, a roll of polymer sheet is provided with a gas channelling means interleaved between the layers of polymer. The roll is exposed to a non-reacting gas at elevated pressure for a period of time sufficient to achieve a desired concentration of gas within the polymer. The saturated polymer sheet is then separated from the gas channelling means and bubble nucleation and growth is initiated by heating the polymer sheet. After foaming, bubble nucleation and growth is quenched by cooling the foamed polymer sheet.

27 Claims, No Drawings

You can search the U.S. Patent & Trademark Office's patent database at:

http://patft.uspto.gov/

CENTER FOR COMMERCIALIZATION
UNIVERSITY *of* WASHINGTON

U.S. PATENT DOCUMENTS

3,096,449	A		7/1963	Stucki	307/88.5
3,517,193	A		6/1970	Mook, Jr. et al.	250/83.1
3,942,759	A		3/1976	Passera et al.	251/129
5,071,064	A		12/1991	AbuJudom et al.	236/1 G
5,475,353	A	*	12/1995	Roshen et al.	335/78
6,427,712	B1		8/2002	Ashurst	60/527
6,457,654	B1		10/2002	Glezer et al.	239/4
6,499,952	B1		12/2002	Jacot et al.	60/527
6,563,933	B1		5/2003	Niederdraenk	381/417
6,609,698	B1		8/2003	Parsons et al.	251/129.17
6,633,095	B1		10/2003	Swope et al.	310/12
6,796,124	B2		9/2004	Kutlucinar	60/528
6,832,477	B2		12/2004	Gummin et al.	60/527
2003/0202048	A1	*	10/2003	Silverbrook	347/54
2003/0206490	A1	*	11/2003	Butler et al.	367/163
2005/0263359	A1	*	12/2005	Mankame et al.	188/266.1
2006/0186706	A1	*	8/2006	Browne et al.	296/203.01

FOREIGN PATENT DOCUMENTS

JP	2002129273	A		5/2002
JP	2002285269	A	*	10/2002

OTHER PUBLICATIONS

Wada, Taishi and Taya, Minoru. "Spring-based actuators." *Smart Structures and Materials 2002*: Active Materials: Behavior and Mechanics, Christopher S. Lynch, Editor, Proceedings of SPIE vol. 4699 (2002). pp. 294-302.

Liang, Yuanchang; Taya, M.; Kuga, Yasuo. "Design of membrane actuators based on ferromagnetic shape memory allow composite for the synthetic jet actuator." *Smart Structures and Materials 2004*. Proc. of SPIE vol. 5390 pp. 268-275.

Wu, Kevin E., and Breur, Kenneth S. "Dynamics of Synthetic Jet Actuator Arrays For Flow Control." *American Institute of Aeronautics and Astronautics*. © 2003. 8pp. Available at: <http://microfluids.engin.brown.edu/Breuer%20Group%20Papers.html>.

Liang, Yuanchange; Taya, M.; Kuga, Yasuo. "Design of diaphram actuator based on ferromagnetic shape memory alloy composite." *Smart Structures and Materials 2003*. Proc. of SPIE vol. 5054 pp. 45-52.

Gorman, Jessica. "Fracture Protection: Nanotubes toughen up ceramics." *Science News Online*. Week of Jan. 4, 2003: vol. 163, No. 1, p. 3.

Lagoudas, Dimitris. "Dynamic Behavior and Shock Absorption Properties of Porous Shape Memory Alloys." *Storming Media*. A577304: Jul. 8, 2002. 3pp.

Lagoudas, Dimitris. "Pseudoelastic SMA Spring Elements for Passive Vibration Isolation: Part I—Modeling." *Storming Media*. A639824: Jun. 2004. 3pp.

Lagoudas, Dimitris C., and Eric L. Vandygriff. "Processing and Characterization of NiTi Porous SMA by Elevated Pressure Sintering." *Center for Mechanics and Composites*. Aerospace Engineering Department, Texas A&M University, 22pp.

Liang, Yuanchang; Taya, M.; Kuga, Yasuo. "Design of membrane actuators based on ferromagnetic shape memory allow composite for the synthetic jet actuator." *Smart Structures and Materials 2004*. Proc. of SPIE vol. 5390 pp. 268-275.

Ye, L.L., Liu, Z.G., Raviprasad, K., Quan, M.X., Umemoto, M., and Hu, Z.Q.. "Consolidation of MA amorphous NiTi powders by spark plasma sintering," *Materials Science and Engineering A241* (*1998*). pp. 290-293.

"Fine Particle Industry Review, 1998." *Business Communications Co*.. May 1999: 5pp.

Suorsa, Ilkka. "Performance and Modeling of Magnetic Shape Memory Actuators and Sensors." 3pp. <http://lib.tkk.fi/Diss/2005/isbn9512276453/>.

Suorsa Ilkka. "Performance and Modeling of Magnetic Shape Memory Actuators and Sensors." *Department of Electrical and Communications Engineering Laboratory of Electromechanics*. Helsinki University of Technology, 70pp.

* cited by examiner

DESIGN OF MEMBRANE ACTUATOR BASED ON FERROMAGNETIC SHAPE MEMORY ALLOY COMPOSITE FOR SYNTHETIC JET ACTUATOR

RELATED APPLICATIONS

This application is based on a prior copending provisional application Ser. No. 60/548,968, filed on Mar. 1, 2004, the benefit of the filing date of which is hereby claimed under 35 U.S.C. § 119(e). This application is also a continuation-in-part of a copending patent application Ser. No. 10/790,634, filed on Feb. 27, 2004 now U.S. Pat. No. 7,104,056, which itself is based on two prior copending provisional applications, No. 60/450,632, filed on Feb. 27, 2003, and Ser. No. 60/450,633, filed on Feb. 27, 2003, the benefits of the filing dates of which are hereby claimed under 35 U.S.C. § 119(e) and 120.

GOVERNMENT RIGHTS

This invention was funded at least in part with DARPA Grant No. N00014-02-1-0689, and the U.S. government may have certain rights in this invention.

FIELD OF THE INVENTION

The present invention generally relates to the use of ferromagnetic shape memory alloys (FSMAs), and more specifically, relates to the use of FSMAs in synthetic jet actuators.

required to induce a change in temperature to initiate an actuation, electromagnetically controlled SMA-based actuators appear to offer promise in applications where rapidly responding actuation is required. Such alloys are referred to as FSMAs.

A particularly useful type of actuator is a membrane or diaphragm actuator. In such an actuator, deflection of a membrane or diaphragm is selectively controllable to car-ryout a desired function. Membrane actuators are useful in hydraulic systems and in hydraulic pumps. It would be desirable to provide improved membrane actuators.

It has been shown that active flow control technology can add external energy into a flow field that helps aircraft improve aerodynamic performance, by reducing jet noise and improving aerodynamic stall characteristics. Such active flow control can be achieved by injecting synthetic jets with high momentum air into the flow at appropriate locations on aircraft wings. For example, the Boeing Company has applied active flow control technology to rotorcraft. Currently, most synthetic jet actuators have been constructed based on piezoelectric actuator materials. However, piezoelectric materials generally do not produce forces sufficiently strong to induce strong jet flow. It would thus be desirable to provide membrane actuators capable of achieving powerful synthetic jets.

The prior art does not teach or suggest magnetically controlled SMA-based membrane actuators, or using such magnetically controlled SMA-based membrane actuators to achieve a synthetic jet.

BACKGROUND OF THE INVENTION

Actuators are relatively simple mechanical components that are often incorporated into more complex mechanical systems, including those found in automobiles, aircraft, manufacturing facilities, and processing facilities. A conventional solenoid is one example of an actuator that has found broad application across many types of industries and technologies.

Shape memory alloys (SMAs) are metals that exist in two distinct solid phases, referred to as Martensite and Austenite. Martensite is relatively soft and easily deformed, whereas Austenite is relatively stronger and less easily deformed. SMAs can be induced to change phase by changes in temperature and changes in mechanical stress. Also, SMAs can generate relatively large forces (when resistance is encountered during their phase transformation) and can exhibit relatively large movements as they recover from large strains. SMAs have been used commercially in many types of actuators, where a temperature change is used to initiate and control the actuation cycle. One of the most widely recognizable applications has been the use of SMA-based actuators in automatic sprinkler systems.

One disadvantage of SMA actuators triggered by changes in temperature is that a heating or cooling device must be incorporated into the actuator, increasing the size, expense, and complexity of the actuator. Further, the response of such an actuator depends on heat transfer, which can occur too slowly for certain applications. Material scientists have more recently recognized that the phase change between Martensite and Austenite can be induced by changes in an applied magnetic field in certain alloys, as well as by changes in temperature and stress loading. Because magnetic fields generated with electromagnets can be rapidly switched on and off, particularly compared to the time

SUMMARY OF THE INVENTION

The present invention is directed to a membrane actuator (also referred to as a diaphragm actuator) in which movement of the membrane/diaphragm is controlled by a magnetic trigger. Such a membrane actuator can be beneficially incorporated into a wide variety of devices, including fluid pumps, shock absorbing systems, and synthetic jet producing devices for use in an aircraft. Significantly, the membrane/diaphragm utilized in the present invention is formed of an SMA. The membrane/diaphragm can be formed from an FSMA, or a ferromagnetic material can be coupled with an SMA such that the SMA and the ferromagnetic material move together. Preferably, the magnetic trigger is configured to induce a stress-induced martensitic transformation in the SMA, to produce a larger force than would be achievable with non-SMA-based materials.

A particularly useful membrane/diaphragm can be formed by attaching ferromagnetic soft iron to a super elastic grade of NiTi shape memory alloy. Preferably, a hybrid magnetic trigger is used, including at least one permanent magnet and at least one electromagnet. The electromagnet portion of the hybrid magnetic trigger enables fast response to be achieved. Such hybrid magnetic triggers, which combine permanent magnets and electromagnets, enable larger deformations of the membrane/diaphragm to be achieved, as compared with electromagnets alone. Permanent magnets alone are less desirable as magnetic triggers, because they cannot be turned on and off as electromagnets can be. If a permanent magnet alone is used as a magnetic trigger, then additional elements must be included to vary the magnetic flux between the permanent magnet and the membrane/diaphragm. For example, a prime mover that would move the permanent magnet relative to the membrane/diaphragm could be employed, but that would significantly increase the

Drawings

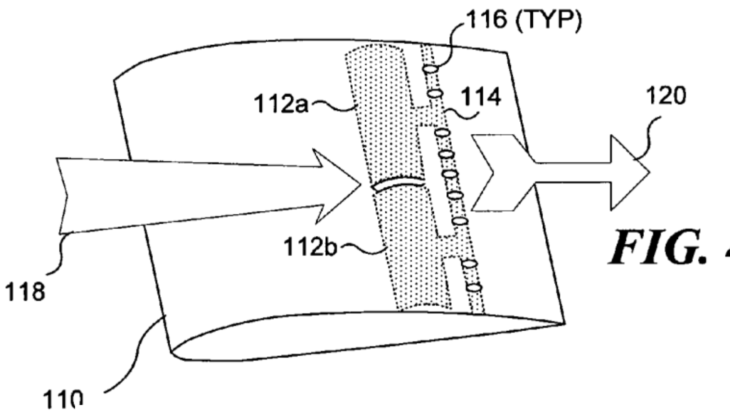


FIG. 4C

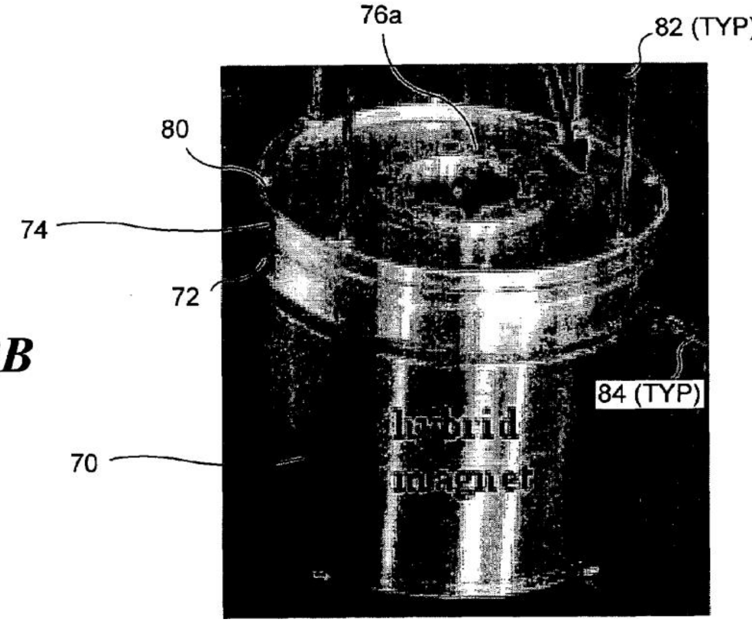


FIG. 8B

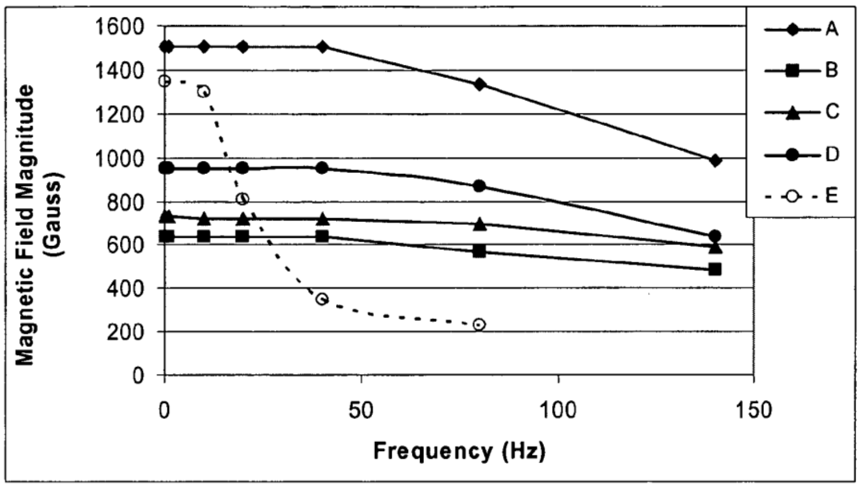


FIG. 15

size, cost, and complexity of the device as compared with devices implementing the more preferred hybrid magnetic trigger.

The present invention further encompasses a method for moving a fluid. In such a method, a membrane/diaphragm comprises at least one of a ferromagnetic material coupled with a SMA and an FSMA. The membrane/diaphragm is placed in fluid communication with the fluid. The magnetic trigger actuates the membrane/diaphragm, such that the actuated the membrane/diaphragm moves from a first position to a second position. Movement of the membrane/diaphragm causes a corresponding movement in the fluid. Preferably, the magnetic trigger employed is sufficiently powerful to induce a martensitic transformation in the SMA. Cyclical actuation of the membrane/diaphragm can be used to pump a fluid or generate a synthetic jet.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

The foregoing aspects and many of the attendant advantages of this invention will become more readily appreciated as the same becomes better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIG. **1**A schematically illustrates a diaphragm actuator in accord with the present invention, including a magnetically actuatable SMA diaphragm and a magnetic trigger;

FIG. **1**B schematically illustrates the diaphragm actuator of FIG. **1**A and shows the diaphragm being displaced by the magnetic trigger;

FIG. **2** schematically illustrates another embodiment of an SMA diaphragm actuator, in which the SMA diaphragm is implemented by attaching ferromagnetic material to a relatively thin SMA sheet, and wherein the magnetic trigger is a hybrid magnetic trigger including both an electromagnet and a permanent magnet;

FIG. **6**C shows the portion of the hybrid magnetic trigger of FIG. **6**A, with a visual representation of magnetic forces when the electromagnet is energized;

FIG. **7**A schematically illustrates a cross-sectional configuration of yet another exemplary hybrid magnetic trigger for use in the SMA diaphragm actuator of FIG. **5**B;

FIG. **7**B is an enlarged view of a portion of the hybrid magnetic trigger of FIG. **7**A and provides a visual representation of magnetic forces when the electromagnet is energized;

FIG. **7**C schematically illustrates a cross-sectional configuration of an exemplary hybrid magnetic trigger for use in the SMA diaphragm actuator of FIG. **5**A;

FIG. **7**D is an enlarged view of a portion of the hybrid magnetic trigger of FIG. **7**C and provides a visual representation of magnetic forces when the electromagnet is energized;

FIG. **8**A schematically illustrates an SMA diaphragm actuator including a hybrid magnetic trigger and an SMA diaphragm, which was fabricated to provide a working model of the SMA diaphragm actuator in accord with the present invention;

FIG. **8**B is a photograph of a working model corresponding to the SMA diaphragm actuator of FIG. **8**A;

FIG. **9**A schematically illustrates how additional hybrid magnetic triggers and SMA diaphragms can be added to the SMA actuator of FIG. **8**A;

FIG. **9**B is a photograph of a working model corresponding to the illustration of FIG. **9**A;

FIG. **10**A schematically illustrates a system for controlling the plurality of hybrid magnetic triggers in FIGS. **9**A and **9**B;

FIGS. **10**B and **10**C schematically illustrate a first actuation sequence for controlling a plurality of hybrid magnetic triggers in an SMA membrane actuator that is based on the configuration shown in FIGS. **9**A and **9**B;

Claims

The invention claimed is:

1. A membrane actuator, comprising:

(a) a membrane configured to be magnetically actuated, actuation of the membrane causing the membrane to move from a first position to a second position, the membrane comprising a shape memory alloy;

(b) a magnetic trigger configured to selectively actuate the membrane; and

(c) an additional membrane disposed such that the membrane and the additional membrane can be actuated by the magnetic trigger.

2. The membrane actuator of claim **1**, wherein the magnetic trigger produces a magnetic field strength sufficient to induce a stress induced martensitic transformation in the shape memory alloy when the membrane is actuated.

3. The membrane actuator of claim **1**, wherein the shape memory alloy comprises a ferromagnetic shape memory alloy.

4. The membrane actuator of claim **1**, wherein the shape memory alloy is super elastic.

5. The membrane actuator of claim **1**, wherein the membrane further comprises a ferromagnetic mass coupled with the shape memory alloy such that the ferromagnetic mass and the shape memory alloy move together, the ferromagnetic mass being configured to be attracted to the magnetic trigger when the magnetic trigger is activated.

6. A membrane actuator, comprising:

(a) a membrane configured to be magnetically actuated, actuation of the membrane causing the membrane to move from a first position to a second position, the membrane comprising a shape memory alloy, wherein the membrane further comprises:

(i) a ferromagnetic mass coupled with the shape memory alloy such that the ferromagnetic mass and the shape memory alloy move together, the ferromagnetic mass being configured to be attracted to the magnetic trigger when the magnetic trigger is activated; and

(ii) at least one spacer disposed between the ferromagnetic mass and the shape memory alloy; and

(b) a magnetic trigger configured to selectively actuate the membrane.

7. The membrane actuator of claim **6**, wherein the at least one spacer is configured to enhance a rigidity of the membrane.

8. The membrane actuator of claim **6**, wherein the at least one spacer is configured to prevent the ferromagnetic mass and the shape memory alloy from contacting during actuation.

9. A membrane actuator, comprising:

(a) a magnetic trigger; and

(b) a membrane configured to be magnetically actuated by the magnetic trigger, actuation of the membrane causing the membrane to move from a first position to a second position, the membrane comprising a shape memory alloy and an iron mass coupled with the shape memory alloy such that the iron mass and the shape memory alloy move together, the iron mass being configured to be attracted to the magnetic trigger when the magnetic trigger is activated.

10. The membrane actuator of claim **9**, wherein the shape memory alloy comprises super elastic nickel titanium (NiTi) alloy.

11. A membrane actuator, comprising:

(a) a magnetic trigger;

(b) a membrane configured to be magnetically actuated by the magnetic trigger, actuation of the membrane causing the membrane to move from a first position to a second position, the membrane comprising a shape memory alloy and a first ferromagnetic mass coupled with the shape memory alloy such that the first ferromagnetic mass and the shape memory alloy move together, the first ferromagnetic mass being configured to be attracted to the magnetic trigger when the magnetic trigger is activated;

Technology Transfer at UW

- Many forms:
  - Teaching
  - Collaborative research
  - Publications
  - Employment of students
  - Licenses of IP rights

Bayh-Dole Act – July 1, 1981
(35 U.S.C. 200-212)

- University may hold title to inventions developed through Federal funding
- University must file patents on inventions they own
- Faculty and staff must disclose and assign inventions to university
- Royalties must be shared with inventors
- Government retains non-exclusive license to the invention
- Government retains march-in rights
- Preference in licensing to small businesses
- Requirement for substantially US manufacture

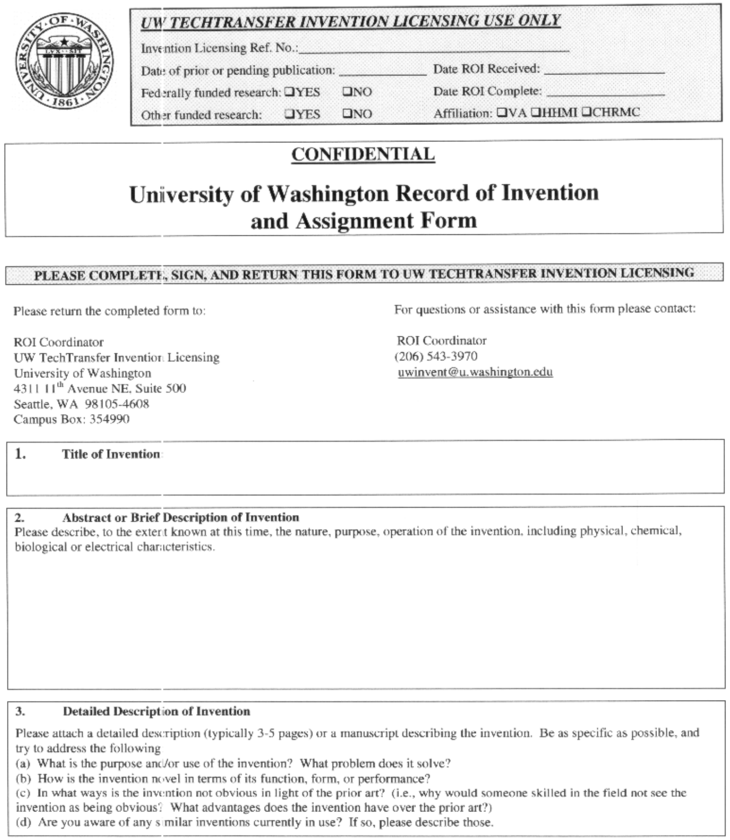
UW policy on disclosure

- University employees are required to report and assign all inventions and discoveries to UW C4C

- Students who are also employees, students working on a sponsored project, and students who have used University resources are also required to report and assign all inventions and discoveries to UW C4C

Record of Invention (ROI) form

- Title of invention
- Names of inventors
- Description, figures, data
- Date conceived
- Stage of development
- Public disclosures made or anticipated
- Inventors' assignment to UW



UNIVERSITY OF WASHINGTON 1861

UW TECHTRANSFER INVENTION LICENSING USE ONLY

Invention Licensing Ref. No.:________________

Date of prior or pending publication: ________ Date ROI Received: ________

Federally funded research: ❑YES ❑NO Date ROI Complete: ________

Other funded research: ❑YES ❑NO Affiliation: ❑VA ❑HHMI ❑CHRMC

CONFIDENTIAL

University of Washington Record of Invention and Assignment Form

PLEASE COMPLETE, SIGN, AND RETURN THIS FORM TO UW TECHTRANSFER INVENTION LICENSING

Please return the completed form to:

ROI Coordinator
UW TechTransfer Invention Licensing
University of Washington
4311 11th Avenue NE, Suite 500
Seattle, WA 98105-4608
Campus Box: 354990

For questions or assistance with this form please contact:

ROI Coordinator
(206) 543-3970
uwinvent@u.washington.edu

1. Title of Invention

2. Abstract or Brief Description of Invention
Please describe, to the extent known at this time, the nature, purpose, operation of the invention, including physical, chemical, biological or electrical characteristics.

3. Detailed Description of Invention

Please attach a detailed description (typically 3-5 pages) or a manuscript describing the invention. Be as specific as possible, and try to address the following
(a) What is the purpose and/or use of the invention? What problem does it solve?
(b) How is the invention novel in terms of its function, form, or performance?
(c) In what ways is the invention not obvious in light of the prior art? (i.e., why would someone skilled in the field not see the invention as being obvious? What advantages does the invention have over the prior art?)
(d) Are you aware of any similar inventions currently in use? If so, please describe those.

depts.washington.edu/techtran

Evaluation of Invention

- Stage of development
  - Invention complete, reproducible results
  - More research and development needed
- Patentability – Prior Art search
- Market assessment – commercial potential
  - What industry need does it meet?
  - Benefits: better, faster, cheaper
  - Important breakthrough, enabling technology
  - Solves current problem

From Disclosure to Patent

- UW TechTransfer makes patenting and licensing decisions
- If UW TechTransfer decides to proceed:
  - Select patent counsel
  - Determine patent type (Provisional, Utility, PCT)
  - Has a public disclosure established a Bar Date?
  - Legal appointment for patent counsel
  - Fund patent application and prosecution costs
- Inventors' role
  - Assignment of patent to UW
  - Interact with patent counsel to develop claims

Deciding against IP Protection

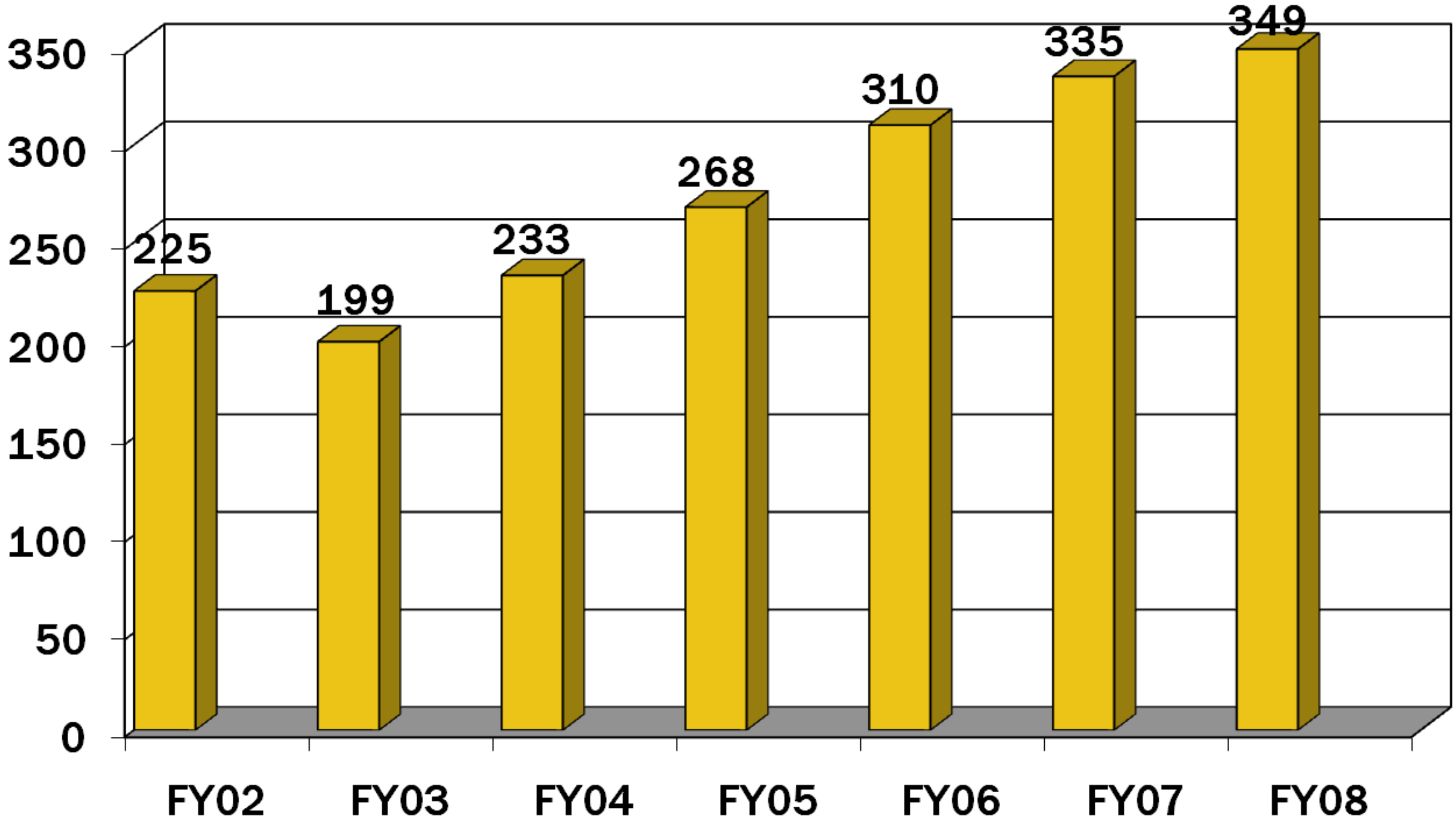
- Not patentable
- Market size issues
- Development risk vs. commercial return
- Unable to determine UW rights

Moving good ideas to market

UW C4C Technology Licensing …

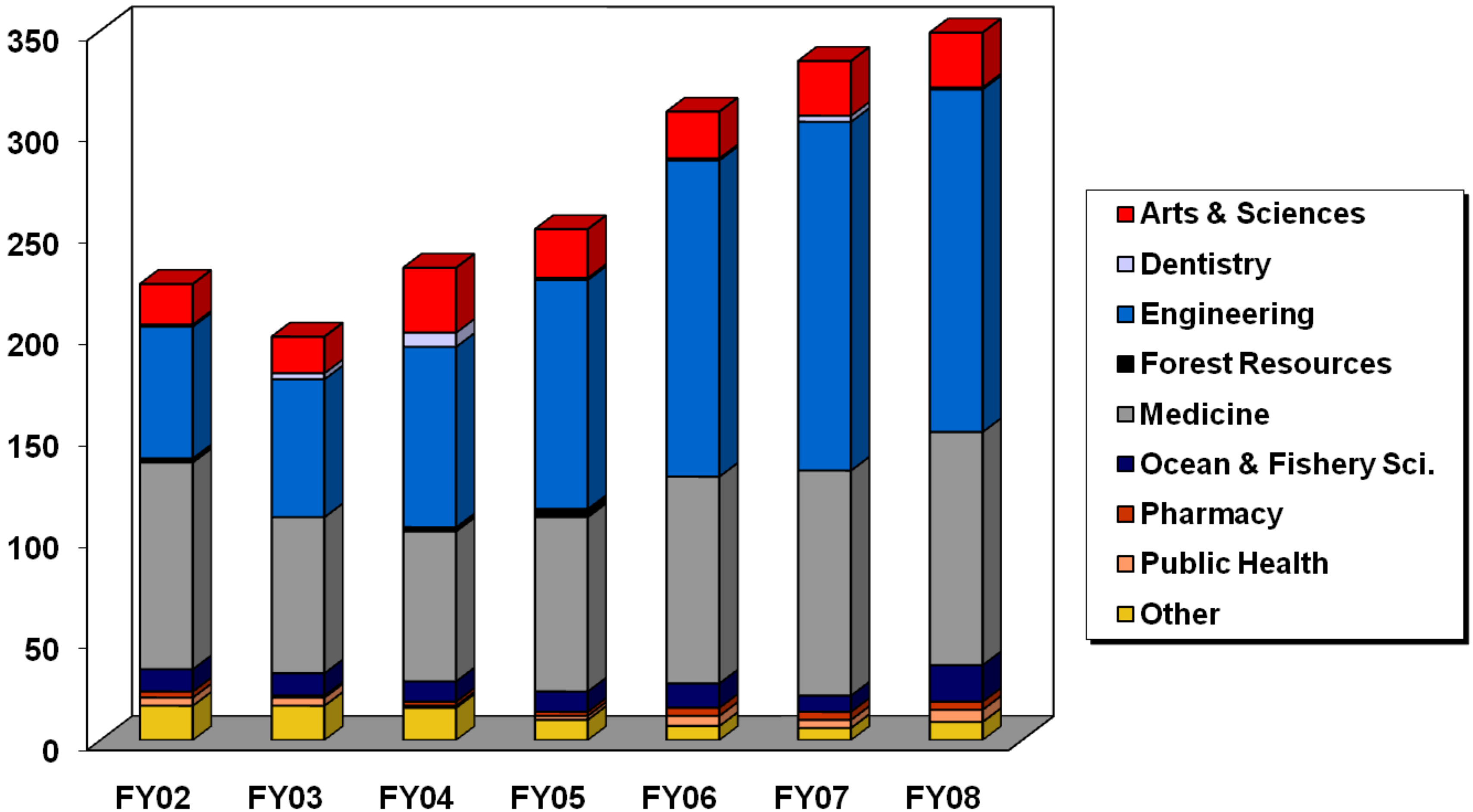
- Works with our inventors to find commercialization pathways
- Evaluates IP – in-house patent agents and resources
- Brings business experts in to consult with inventors (entrepreneurs-in-residents, industry liaisons)
- Seeks companies interested in developing the technology
- Negotiates and manages licenses and agreements
- Manages obligations/reporting to sponsors of research
- Maintains the IP
- Helps with funding sources (private funding and grants)

Inventions Disclosed



CENTER FOR COMMERCIALIZATION
UNIVERSITY of WASHINGTON

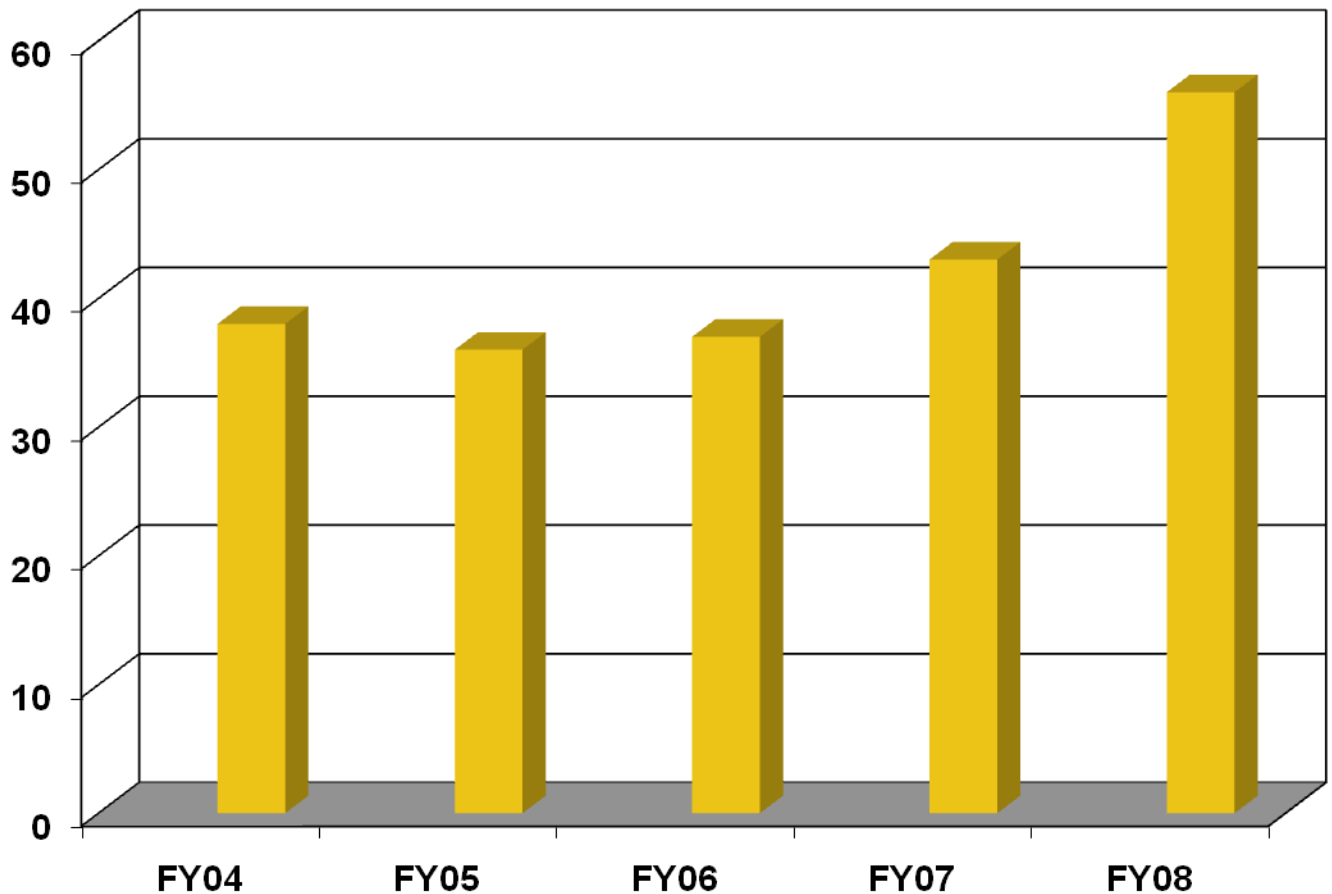
Inventions by College/School



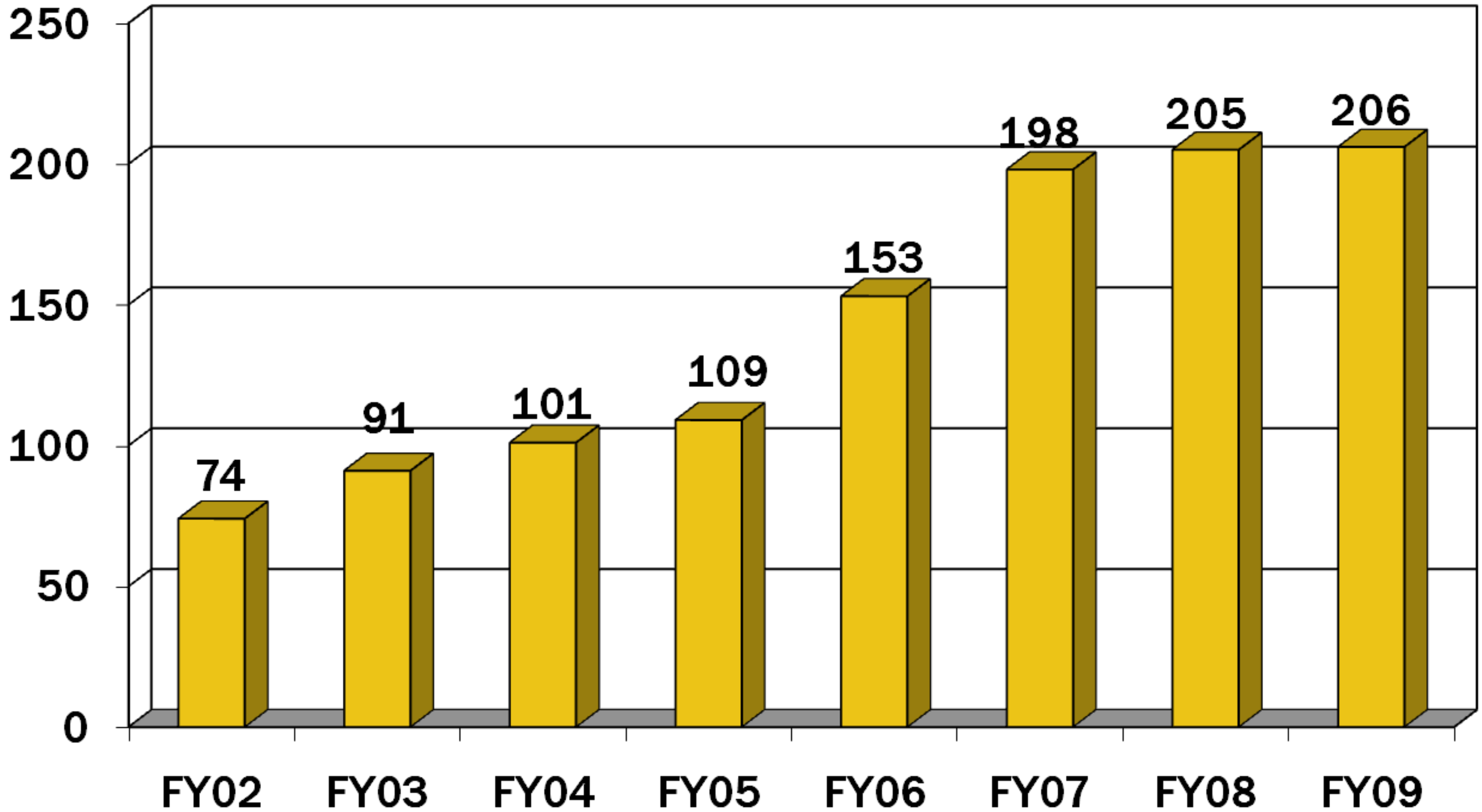
Inventions by Department (FY08)

Department	No. of Contributions
Mechanical Engineering	63
Electrical Engineering	43
Bioengineering	29
Radiology	15
Department of Medicine	15
Computer Science & Engineering	14
Chemistry	13
Applied Physics Lab	13
Materials Science & Engineering	13

Patents Issued



Licenses and Options



Top Ten Revenue-Generating Technologies

Title	Researchers
Polypeptides in Yeast	Hall, Ammerer
Clotting Factor/Factor IX	Davie, Kurachi
Flow Cytometry Technologies	van den Engh, Esposito
Hepatitis B Vaccine	Hall, Ammerer
Tape Management Library for STK 4400 Systems	Profit, McHarg, Mason
Simplified High Frequency Tuner and Tuning Method	Suominen
Magnetic Stereotactic System for Treatment Delivery	Mayberg, Grady, Howard
Metabolism-based Drug Interaction Database	Ragueneau, Carlson, Levy
Mass Spectrometry Fragmentation Patterns in Peptides	Yates, Eng
Synthetic Retinoids for the Treatment of Retinal Disease	Palczewski, van Hooser, Kuksa, Saperstein, Batten

Questions?

Contact Information:

Patrick Shelby

jpshelby@uw.edu

(206) 685-4501

CENTER FOR COMMERCIALIZATION

UNIVERSITY *of* WASHINGTON