



EMORY UNIVERSITY

Annual Report  
Fiscal Year 2007

OFFICE of TECHNOLOGY TRANSFER

# developing a World Class Product Pipeline

Over **18** products to market

The central graphic features a blue globe surrounded by various scientific and medical elements. At the top left, a hand holds a black beetle. To the right, a red and orange curved line points to the text 'Over 18 products to market'. Below this, a list of drug names and their indications is visible, including Atripla™ (HIV, HBV), Entriova™ (HIV), and EXPECT II™ (HIV, Hepatitis C, Cancer). In the foreground, several white pills are scattered. At the bottom left, the EmtechBio logo is displayed with the tagline 'SCIENCE TO BUSINESS'. At the bottom right, the Cardiac Tool Box™ logo is shown. The background includes a grid pattern and a heartbeat line.

**Atripla™**  
HIV  
HIV  
HIV  
HBV  
HIV  
HIV

**Entriova™**  
HIV

**EXPECT II™**  
HIV  
Hepatitis C  
Cancer  
HIV  
HIV  
HIV  
Fragile X syndrome  
Cancer  
Proliferative Disorders

**Cardiac Tool Box™**

**EmtechBio**  
SCIENCE TO BUSINESS

DIAGNOSTIC/DEVICE PRODUCTS

Licenses  
Indication  
Restenosis  
Spinal Cord

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## Letter from the Director

In the past four years, the Office of Technology Transfer has emerged from a small group of eight to a current staff of 18. During this time, licensing, finance, and administrative teams were expanded and two new roles were created to capitalize on opportunities inherent in proactive technology scouting, reliable start-up support, and post-licensing diligence. I believe that our achievements this past year clearly illustrate the benefits of an increased investment in the program.

New to the office this year is the EMTech Bio incubator. Emory and Georgia Tech will continue their partnership through the EMTech Corporation, but management of the incubator has been shifted from Georgia Tech to Emory's OTT. We will study the EMTech business model closely over the next 12 months to identify ways to enhance its tenant offerings and leverage its ability to help create value in Emory start-up companies.

The licensing team closed a record high 40 licensing deals this year. Eight of these deals have high net worth potential with an average royalty rate of 5.5%. Also particularly noteworthy is the achievement of an average turn-around time of 8.8 days for material transfer agreements, validating OTT's commitment to serving Emory researchers. Technology scouting efforts enabled a new high of 150 invention disclosures and OTT facilitated the launching of a record six start-up companies this year.

The Emory Product Pipeline continues to provide the best tool for tracking the potential for and impact of Emory technology. Securing sufficient funding is always a challenge for companies and a number of our licensees had great success in this arena in FY07. Metastatix secured a total of \$7.5M in Series A funding. Achillion Pharmaceuticals and Pharmasset completed IPOs this year, raising \$51.8M and \$45M, respectively. In addition, GeoVax Labs completed a reverse merger and then raised an additional \$7.5M through a private placement to advance its AIDS vaccine development efforts.

The achievement of regulatory milestones is critical for the ongoing success of potential new products. This year, Velocity Medical Solutions obtained 510(K) clearance for its Velocity

Advanced Imaging software (VelocityAI™). In addition, Cougar Biotechnology's IND application for CB3304 was allowed by the FDA. Unfortunately, Atherogenics' AGI-1067 failed to meet the composite primary endpoint in its Phase III ARISE trial. However, the company announced enrollment of the first patients in a new Phase III clinical trial for use of the drug as an oral anti-diabetic agent.

Our achievements in the past several years, including our \$540M monetization in FY05, have put Emory in an ideal position to create a strategy that will guide our technology commercialization efforts over the next five years. Development of this commercialization strategy was initiated this year and discussions are scheduled with senior administration in the coming year to vet and adopt an effective strategy to assure even greater success in years to come without abandoning the practices that have served us so well thus far.



Todd T. Sherer, PhD  
Associate Vice President for Research and Director,  
Office of Technology Transfer



## Fall

- Emory hosted an OTT Breakfast Club meeting in New York City to showcase Emory technologies and business opportunities to VC attendees representing 10 venture capital funds.
- GeoVax completed a reverse merger with Illinois-based Dauphin Technology, Inc. and became a publicly traded company named GeoVax Labs, Inc.
- RFS Pharma initiated a multi-international site Phase IIa study of DAPD alone and in combination with AZT.
- Achillion Pharmaceuticals' IPO raised \$51.8 million.

## Winter

- 3Ti received first prize in the Southeastern BIO Investor Forum Early-Stage Company "Shootout".
- Metastatix, GeoVax Labs, and AtheroGenics won Georgia Bio's Deal of the Year awards for early stage financing, merger & acquisition, and strategic transaction, respectively.
- GeoVax Labs accelerated plans to move toward a large Phase II clinical trial for its AIDS vaccine upon receiving successful early results for two ongoing Phase I trials.
- Metastatix completed its Series A (2<sup>nd</sup>) round financing and raised \$3.9 million.

## Spring

- AtheroGenics' drug AGI-1067 failed to meet the composite primary endpoint in their closely watched, 6100-patient Phase III atherosclerosis trial.
- OTT presented a series of seminars at Yerkes that covered IP protection, partnering with industry, faculty entrepreneurship, and drug discovery.
- Pharmasset's IPO raised \$45 million.
- 3 Emory technologies finished in the top ten in the inaugural BIO/Plan business plan competition sponsored by Southeast Bio.

## Summer

- OTT assumed management and oversight of the EMTech Bio incubator.
- iThemba Pharmaceuticals, a new startup based in South Africa, secured its initial funding of around \$4 million from BioPAD and LIFE Lab.
- Cougar Biotechnology's IND application for CB3304 was allowed by the FDA, allowing plans for a multiple myeloma Phase I study to advance.
- 3Ti secured over \$300k in financing to accelerate the development of its Aegis™ automated blood analyzer.

## The Emory Product Pipeline - Therapeutics

# Product Pipeline

Product Pipeline::Therapeutics			Preclinical	Phase I	Phase II	Phase III	NDA	Market
3TC (Combivir®)	GlaxoSmithKline/Shire	HIV	████████	████████	████████	████████	████████	████████
3TC (EpiVir®)	GlaxoSmithKline/Shire	HIV	████████	████████	████████	████████	████████	████████
3TC (EpiVir-HBV®)	GlaxoSmithKline/Shire	HBV	████████	████████	████████	████████	████████	████████
3TC (Epzicom™)	GlaxoSmithKline/Shire	HIV	████████	████████	████████	████████	████████	████████
3TC (Trizivir®)	GlaxoSmithKline/Shire	HIV	████████	████████	████████	████████	████████	████████
FTC (Atripla®)	Gilead Sciences, Inc.	HIV	████████	████████	████████	████████	████████	████████
FTC (Emtriva®)	Gilead Sciences, Inc.	HIV	████████	████████	████████	████████	████████	████████
FTC (Truvada®)	Gilead Sciences, Inc.	HIV	████████	████████	████████	████████	████████	████████
AGI-1067	AtheroGenics, Inc.	Diabetes	████████	████████	████████	████████		
±FTC (Racivir®)	Pharmasset, Inc.	HIV	████████	████████	████████			
β-L-Fd4C (elvucitabine)	Achillion Pharmaceutical	HIV	████████	████████	████████			
DAPD (amdoxovir)	RFS Pharma, LLC	HIV	████████	████████	████████			
DFC (dixelvucitabine)	Pharmasset, Inc.	HIV	████████	████████	████████			
OBI-1 (rpfVIII)	Octagen Corporation	Hemophilia	████████	████████	████████			
AGI-1096	AtheroGenics, Inc.	Transplant Rejection	████████	████████				
DNA/MVA HIV Vaccine	GeoVax, Inc.	HIV	████████	████████				
APD	RFS Pharma, LLC	HIV/HBV	████████					
CB 3304 (noscapine)	Cougar Biotechnology	Multiple Myeloma	████████					
CB 6604 (ER noscapine)	Cougar Biotechnology	Cancer	████████					
CUR-024	Curry Pharmaceuticals	Cancer	████████					
CUR-770	Curry Pharmaceuticals	Psoriasis	████████					
DOT	RFS Pharma, LLC	HIV	████████					
MSX-122	Metastatix, Inc.	Cancer	████████					
STX107	Seaside Therapeutics	Fragile X Syndrome	████████					
2'-Fluoronucleosides	Pharmasset, Inc.	HIV	██████					
BCX-4678	BioCryst Pharm, Inc.	Hepatitis C	██████					
CXCR4 Receptor Antagonist	Metastatix, Inc.	HIV	██████					
CXCR4 Receptor Antagonist	Metastatix, Inc.	Inflammatory Disease	██████					
Noscapine Analogs	Cougar Biotechnology	Cancer	██████					
Sphingolipids	Slainte Bioceuticals	Proliferative Diseases	██████					

## The Emory Product Pipeline – Diagnostics and Devices

# Product Pipeline

### Product Pipeline::Diagnostic/Device Products

Requiring IND/IDE/NDA Regulatory Processes

Product	Licensee	Indication	Preclinical	Phase I	Phase II	Phase III	NDA	Market
Beta-Cath™	Best Vascular, Inc.	Restenosis	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■	■■■■■
Braingate™	Cyberkinetics	ALS/MND	■■■■■	■■■■■				
Braingate™	Cyberkinetics	Spinal Cord/Stroke/MD	■■■■■	■■■■■				
FACBC	Nihon-Medi-Physics	Tumor Imaging	■■■■■					

### Product Pipeline::Diagnostic/Device Products

Requiring 510K Regulatory Processes

Product	Licensee	Indication	Prototype	Registration Trial(s)	510(k)/PMA Application	Market
CLEARGLIDE™	Datascope Corp.	Vein Harvesting	■■■■■	■■■■■	■■■■■	■■■■■
ECTb™	Syntermed, Inc.	Cardiac Imaging	■■■■■	■■■■■	■■■■■	■■■■■
ExSPECT II™	Philips Medical Systems	Cardiac Imaging	■■■■■	■■■■■	■■■■■	■■■■■
Fragile X Diagnostic Test	Quest and others	Fragile X Syndrome	■■■■■	■■■■■	■■■■■	■■■■■
NeoControl®	Neotonus, Inc.	Incontinence	■■■■■	■■■■■	■■■■■	■■■■■
QuantEM™	GE Medical Systems	Renal Imaging	■■■■■	■■■■■	■■■■■	■■■■■
VelocityAI™	Velocity Medical Solutions	Oncology Imaging	■■■■■	■■■■■	■■■■■	■■■■■
NeuroStar TMS Therapy™	Neuronetics, LLC	Depression	■■■■■	■■■■■	■■■■■	
Neurostimulator (RNS™)	NeuroPace, Inc.	Epilepsy	■■■■■	■■■■■		
OxLDL	CPD, LLC	Heart Disease	■■■■■	■■■■■		
Aegis™	3Ti	Immunoematology	■■■■■			
Tumor Marker Kit	ALVitae Pharmaceuticals	Cancer	■■■■■			

### Product Pipeline::Consumer Products

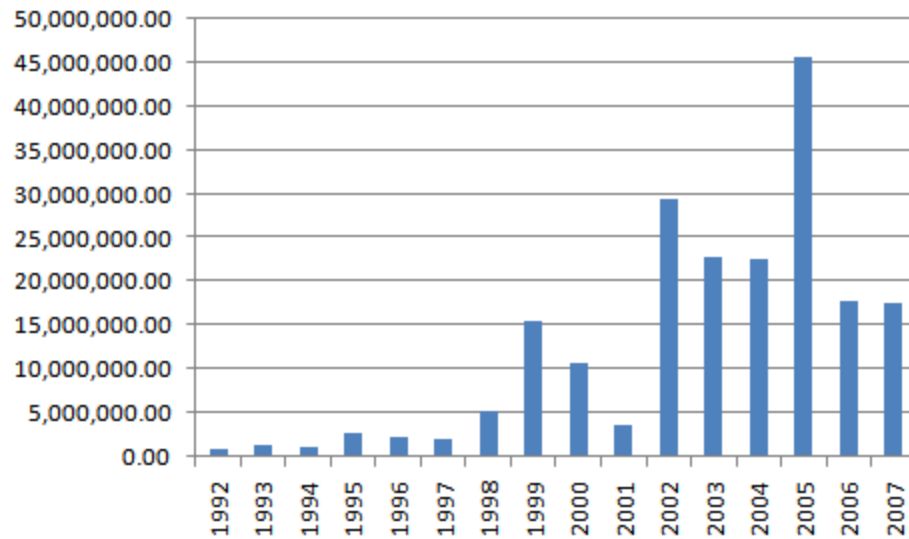
Product	Licensee	Indication	In Development	Market
Duralast (antimicrobial)	Duraban International	Construction Industry	■■■■■	■■■■■
Duralast OEM (antimicrob.)	Duraban International	Construction Industry	■■■■■	■■■■■
Goldshield™	NBS Technology, LLC	Antimicrobial Shield	■■■■■	■■■■■
Sucrets® DEFENSE	GSH Biomedical Ltd.	Immune System Boost	■■■■■	■■■■■
Antimicrobial coating	LAAMScience	Antimicrobial Coating	■■■■■	

## Revenue

As a result of the monetization of Emory's royalties on FTC, revenues continue to be less than in previous years, with this year at \$17,681,765.35.

Since 1992, the total revenue received for licensing received is a grand total of \$741,361,842.20 through FY07 from the commercialization of Emory technologies.

## Net Fees and Royalties by Year



Summary of Expenditures and Revenues for FY92–FY07

Fiscal Year	Total Patent Expenses	Reimbursed Patent Expenses	Reimbursed Past Patent Expenses	License Revenue *	Return on Patent Expense Investment **
1992	\$(243,554.87)	\$137,868.56		\$978,181.83	\$872,495.52
1993	\$(316,315.79)	\$174,066.98		\$1,278,731.43	\$1,136,482.62
1994	\$(448,767.07)	\$182,100.50		\$1,083,398.45	\$816,731.88
1995	\$(585,415.31)	\$245,178.91		\$2,637,146.69	\$2,296,910.29
1996	\$(1,210,632.63)	\$777,391.86		\$2,316,793.30	\$1,883,552.53
1997	\$(1,066,584.60)	\$284,074.69		\$2,115,559.48	\$1,333,049.57
1998	\$(1,524,810.61)	\$551,263.85		\$5,313,706.40	\$4,340,159.64
1999	\$(2,332,896.46)	\$500,948.48		\$15,437,285.00	\$13,605,337.02
2000	\$(3,266,373.14)	\$671,767.20		\$10,671,921.65	\$8,077,315.71
2001	\$(4,568,569.50)	\$4,005,408.35		\$3,608,156.91	\$3,044,995.76
2002	\$(7,155,792.41)	\$889,586.94	\$145,248.51	\$29,557,916.39	\$23,436,959.43
2003	\$(2,565,067.46)	\$931,626.59	\$349,629.66	\$22,737,389.16	\$21,453,577.95
2004	\$(2,190,578.77)	\$835,926.24	\$234,408.31	\$22,517,830.24	\$21,397,586.02
2005	\$(1,852,482.44)	\$605,011.07	\$244,028.90	\$45,656,765.15	\$44,653,322.68
2005 ***				\$540,000,000.00	\$540,000,000.00
2006	\$(2,063,712.70)	\$951,051.43	\$199,565.42	\$17,769,294.77	\$16,856,198.92
2007	\$(2,453,499.56)	\$1,141,245.12	\$447,385.29	\$17,681,765.35	\$16,816,896.20
<b>Total</b>	<b>\$(33,845,053.32)</b>	<b>\$12,884,516.77</b>	<b>\$1,620,266.09</b>	<b>\$741,361,842.20</b>	<b>\$722,021,571.74</b>

\* License Revenue includes Emory's Share only; amounts distributed to other institutions not included.

\*\* Return on Patent Expense Investment is equal to the sum of License Revenue, Reimbursed Past Patent Expenses, and Reimbursed Patent Expenses minus the Total Patent Expenses.

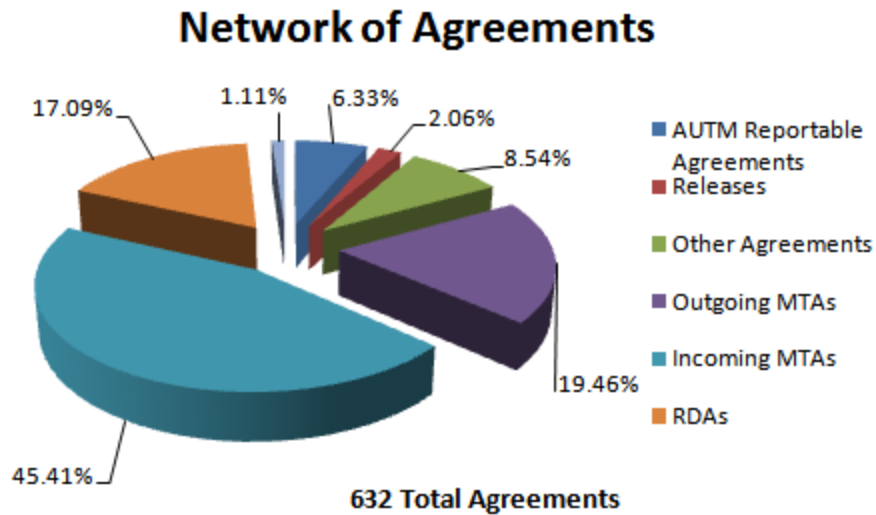
\*\*\* Revenue received in connection with the monetization of future FTC royalties.



## Non-Financial Metrics Network of Agreements

The pie chart below demonstrates the complexity of the network of agreements that must be executed to protect Emory's intellectual property. A total of 632 contracts were executed. The largest share of contracts on a numbers basis continues to be incoming MTAs which govern the use of outside biological materials by Emory investigators. RDAs (confidentiality agreements)

and outgoing MTAs come in 2<sup>nd</sup> and 3<sup>rd</sup>, respectively. AUTM reportable license agreements are the "bread and butter" of any technology transfer program as these agreements represent opportunities to get new products to market and to generate revenue. Forty AUTM reportable agreements were executed this year, a record high for the office. The licensees for each of these agreements are listed on page 20.



## AUTM Reportable Agreements

### License Agreements by Type > \$1,000

License Category	FY07	FY06	FY05	FY04	FY03
Exclusive Licenses & Start-Ups	13	6	7	14	5
Non-exclusive Licenses & Commercial MTAs	23	14	21	12	8
Option Agreements	4	2	2	1	3
<b>Total</b>	<b>40</b>	<b>22</b>	<b>30</b>	<b>27</b>	<b>16</b>

\* Note: These option agreements were embedded in the license agreements listed above; not included in the total amount

### License Agreements by Technology > \$1,000

Technology Category	FY07	FY06	FY05	FY04	FY03
Biological Materials	14	13	17	10	10
Computer Software	6	0	2	3	0
Medical Devices	2	1	0	2	1
Method of Synthesis	3	0	3	1	0
Therapeutic Materials	8	6	2	6	0
Diagnostic Materials	0	0	1	3	2
Vaccine Material	0	0	0	0	0
Method of Treatment	1	0	2	0	2
Other	6	2	3	2	1
<b>Total</b>	<b>40</b>	<b>22</b>	<b>30</b>	<b>27</b>	<b>16</b>

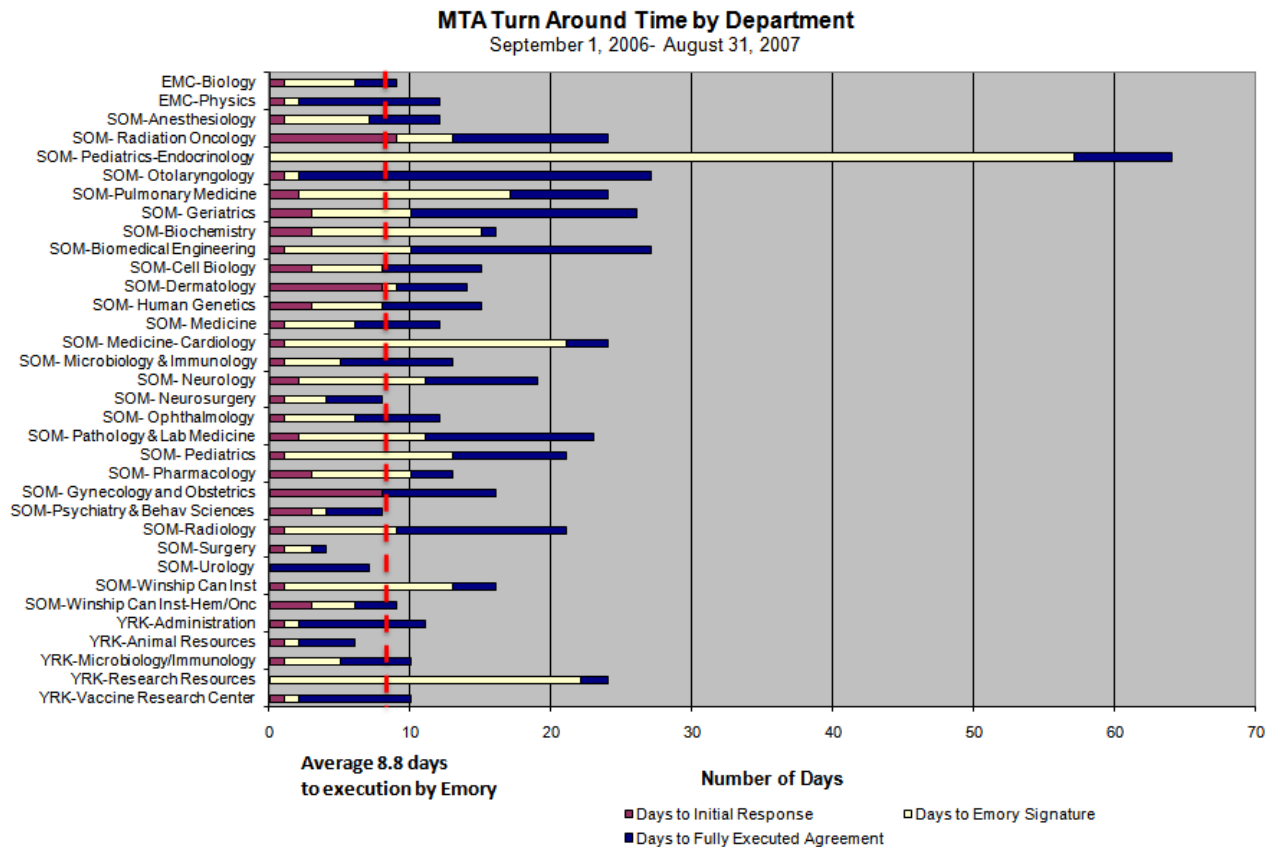
## Non-AUTM Reportable Agreements

Agreement Type	FY07	FY06	FY05	FY04	FY03
Other Agreements	54	34	49	41	48
Amendments	15	12	13	18	17
IIAs	8	2	2	3	10
In-licenses	0	0	0	3	3
Non-exclusive	3	2	2		
Sub-licenses	0	5	2	0	3
Other, including Assignments, MOU, Promissory Notes, Registration Rights, Royalty Sharing, Service, Stock Purchase, etc.	28	13	32	16	5
Outgoing Material Transfer Agreements	123	100	132	75	65
Incoming Material Transfer Agreements	287	236	287	233	221
Restricted Disclosure Agreements	108	113	108	120	57
Research Agreements (with IP option)	7	3	9	53	38
Release to Inventor Agreements	13	11	16	3	6
<b>Total</b>	<b>592</b>	<b>497</b>	<b>601</b>	<b>525</b>	<b>435</b>

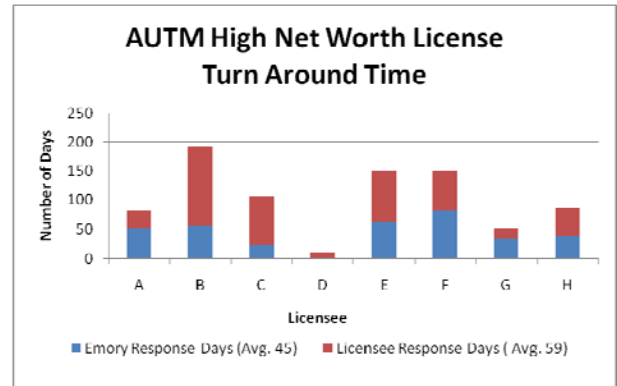
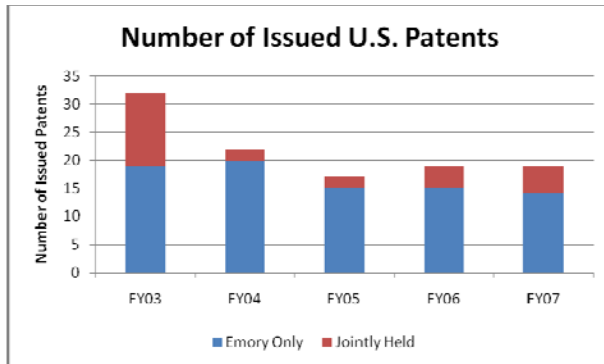
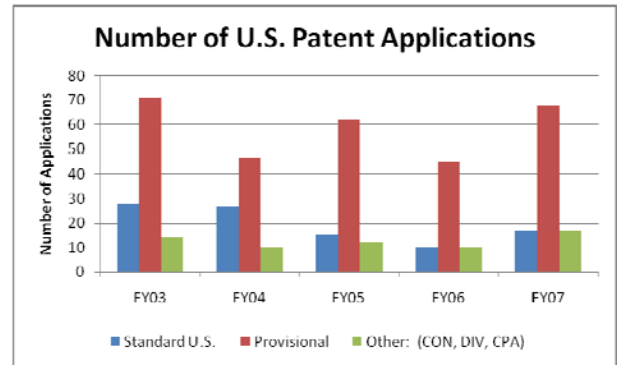
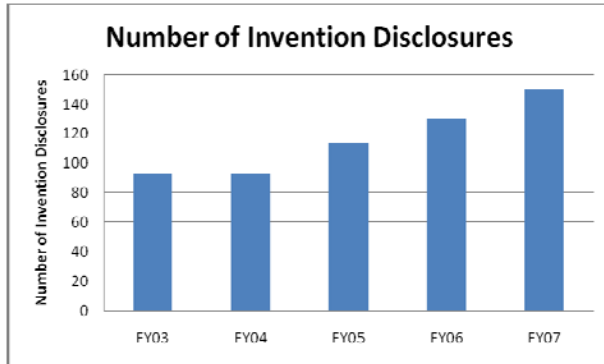
## MTA Program

In FY07, a key goal for the Material Transfer Agreement (MTA) program was to exceed last year's performance metrics. During the year, the Material Transfer Agreement (MTA) team processed and executed 410 total agreements (22% increase over FY06). The average turn-around time for incoming MTAs was 8.8 days, a reduction of 51% compared to FY06. The MTA team's accomplishments in FY'07 contributed to OTT's goal to provide outstanding service to faculty customers.

Incoming MTA turn-around time by department is shown below:



## Disclosures, Patents and Agreements





## Disclosures, Patents and Agreements by School

The following agreements (identified in particular categories) are associated with personnel/researchers in the following schools:

Agreement	SOM	College	SOM and EMC	Public Health	Yerkes	Other
40 AUTM Reportable Agreements	32	7	1	0	0	0
13 Releases	13	0	0	0	0	0
54 Other Agreements	42	5	6	0	1	0
123 Outgoing MTAs	116	5	0	0	3	0
287 Incoming MTAs	259	6	0	0	20	0
108 RDAs	91	3	0	2	2	12
7 CRA/RA	7	0	0	0	0	0
<b>632 Agreements</b>	<b>559</b>	<b>34</b>	<b>7</b>	<b>2</b>	<b>26</b>	<b>12</b>

### Patents

19 US Patents issued on Emory technologies, 14 of which are solely owned by Emory, and 5 of which are jointly owned by Emory and/or an Emory licensee or an Emory research partner. Of these, 2% (6) of issued patents are licensed. The creation of the technology embodied in these patents emanated from the various schools as follows:

- 16 created in the School of Medicine
- 1 created in Emory College
- 2 created in SOM/College

### Disclosures

150 Invention Disclosures were submitted to OTT this year; 11 of these disclosures have been released to the inventors, 3 have become inactive and the remaining 136 are active. The contributors to these disclosures are located in the following schools:

- 123 created in the School of Medicine
- 8 created in Emory College
- 6 created jointly in the School of Medicine and Emory College
- 4 created jointly in the School of Medicine and Yerkes Primate Research Center
- 1 created jointly in the School of Medicine and School of Public Health
- 2 created in School of Public Health
- 4 created in Yerkes Primate Research Center
- 1 created in Academic Admin
- 1 created in Goizueta Business School

## Emory FY07 Start-Up Companies

### LAAMScience, Inc.

LAAMScience, Inc. (Research Triangle Park, NC) is developing durable surface coating chemical products that inactivate viruses and bacteria when exposed to visible light. The company's light activated microbial coating technology can be applied in a nano-thin layer to fabrics such as cotton, nylon, and polyester. LAAMScience is in the process of obtaining FDA approval for its initial products incorporating the coating technology: a respirator mask for the general public and a surgical mask for hospital use. LAAMScience's flagship technology was developed by Stephen Michielsen of North Carolina State University and Drs. Igor Stojiljkovic and Gordon Churchward of Emory (Microbiology and Immunology). LAAMScience's product development is currently funded by angel investors.

### Velocity Medical Solutions, LLC

Velocity Medical Solutions, LLC (Atlanta, GA) was jointly founded by Emory radiation oncologist Ian Crocker, medical physicist Timothy Fox, and computational imaging scientist Paul Pantalone. Velocity develops post-diagnostic medical imaging software products based on proprietary, copyrighted scientific algorithms. Velocity's software products feature multi-modality image registration and automated tumor contouring. In March 2007, Velocity obtained 510(k) approval for its first software package, VelocityAI™. VelocityAI™ is a tool for physicians to analyze and interpret various diagnostic imaging scans such as positron tomography (PET), computed tomography (CT), magnetic resonance (MR) and single photon emission computed tomography (SPECT). Velocity's product development has been funded by GRA VentureLab grants and the founders' private capital.

### Zetra Biologicals, LLC

Zetra Biologicals, LLC (Atlanta, GA) is a preclinical stage biotechnology company. Zetra is developing innovative vaccines against pandemic influenza and other infectious diseases. The company was formed around the novel chimeric virus-like particle (VLP) technology developed by scientific founder Dr. Richard Compans (Immunology and Microbiology). The chimeric VLP technology has the potential to dramatically simplify the vaccine manufacturing process and reduce the time to market. Zetra's start-up activities have been funded by GRA VentureLab grants.

### BioSequent, LLC

BioSequent, LLC (Atlanta, GA) is developing an advanced generation of biomaterials, devices, and pharmaceuticals for cardiovascular applications. Emory vascular surgeon Dr. Elliot Chaikof and Emory chemist Dr. Vincent Conticello are the scientific founders. The company's core technology consists of elastin-mimetic protein triblock copolymers that can be formulated into synthetic bypass grafts for surgical treatment of both peripheral and coronary vascular diseases. Currently, there are no synthetic products on the market suitable for use as bypass grafts for blood vessels 6 millimeters or less in diameter. Initial studies suggest that BioSequent's synthetic bypass grafts can overcome the size limitation and other technical limitations of currently available products. BioSequent is currently financed by GRA Ventruelab grants and private capital.

### iThemba Pharmaceuticals (PTY), Ltd.

iThemba Pharmaceuticals (PTY), Ltd. (Mpumalanga, South Africa) is a preclinical stage company developing new anti-viral and anti-bacterial drugs for tuberculosis (TB), HIV and other infectious diseases. iThemba was founded on novel isocitrate lyase inhibitors, their derivatives and conjugates; and novel synthetic methods of carbocyclic nucleosides discovered in the lab of scientific founder Dr. Dennis Liotta (Chemistry). iThemba recently secured \$4 million in start-up funding from South Africa-based biotech incubators, BioPad and LifeLab.

### Cylerus, Inc.

Cylerus, Inc. (Beaverton, OR) is an early stage medical device company. The company is developing devices and methods for localized drug delivery. Cylerus' products are based on novel vascular graft technology developed by scientific founder and former Emory faculty member Dr. Stephen Hanson (Hematology/Oncology). Cylerus' technology will potentially allow physicians to infuse therapeutic agents through the wall of a porous vascular graft. Cylerus' start-up activities are funded by the founder's private capital.