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BUSINESS INCUBATORS AND THE CREATION OF TECHNOLOGY-BASED FIRMS.  
1) SUPPORT STRUCTURES FOR THE CREATION OF SPIN OFF COMPANIES  
BY UNIVERSITY RESEARCHERS \*

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\* The opinions expressed in this paper are those of the author and do not necessarily reflect the position of WIPO and/or ECLAC.

## I. EMORY UNIVERSITY

### A. The Institute

1. Emory University was founded in 1836 and is home to ten major academic divisions and numerous centers for research and advanced study. In addition to Emory College, the University encompasses a graduate school of arts and sciences; professional schools of medicine, theology, law, nursing, public health, and business; Oxford College, a two-year undergraduate division on the original Emory campus in Oxford, Georgia, and Yerkes National Primate Research Center. The school is a progressive teaching, research and service University, with more than 11,000 students and over 2500 faculty from all fifty states and over 118 countries.

2. Emory is undergoing unprecedented growth and achievement. It is experiencing a surge in research support, especially in the health sciences, and is attracting sought-after faculty and students. Its 631-acre Atlanta campus, located 15 minutes from downtown Atlanta, is positioned along the Clifton Corridor, which also includes the U.S. Centers for Disease Control and Prevention and the American Cancer Society. Emory's Robert W. Woodruff Health Sciences Center includes Emory Healthcare, the most comprehensive health care delivery system in Atlanta.

### B. Research

3. Funding for research has increased from less than \$50 million in 1985 to over \$270 million in 2002, making Emory one of the fastest-growing research universities in the country. As research efforts have increased, the attitudes of scientists toward commercialization of research have also shifted. Researchers are becoming more entrepreneurial and are now more likely to become involved in the commercialization of their inventions than 10 years ago.

### C. Technology Transfer

OTT Statistics FY 2002	
Invention Disclosures	93
Patent Applications	88
Issued Patents	25
Agreements (>\$1000)	28
Net Fees and Royalties	\$29 million

#### D. History of Commercialization at Emory

4. Since the mid-1980s Emory University technologies have been licensed to a number of start-up companies. Beginning with CytRx in 1985 and Novoste in 1987, Emory has gone on to start at least one company every year since 1995. The university currently holds equity in seventeen companies. The most recent success story from this group is Triangle Pharmaceuticals, a 1995 spinout that was acquired by Gilead Sciences in 2002 for \$464 million.

## II. INTRODUCTION

5. The purpose of this report is to discuss the sequential levels of support that are needed to assist university spin-offs in the early stages of company formation and the commercialization process. Emory University's existing programs and plans for expanded programs will be covered with comments on the lessons that have been learned and challenges that have been faced along the way.

6. University spin-off companies are created to commercialize inventions discovered in university labs. In the State of Georgia support for spin-off companies is provided not only by the universities, but also by the Georgia Research Alliance (GRA), a state-sponsored non-profit organization.

7. GRA has provided financial support for the development of university-based incubators and has provided funds for the development of a VentureLab commercialization program that may eventually be adapted at all of the major research universities in the state.

8. Faculty inventors typically have some form of relationship with the company whether it is on the scientific advisory board, consultant or company officer. The support provided by the university to the start-up company should be envisioned in stages. As the company takes shape different needs arise. The types of supports that will be discussed in this report include the following.

9. Services and Facilities Currently Provided:

- Technology Transfer
- Commercialization Support
  - i) University Opportunity Fund
  - ii) Seed Grant Program
  - iii) Incubator Facilities
    - a) Wet Lab/Office space
    - b) Shared equipment, business services
    - c) Seminars

## 10. In the Works

- Commercialization Support
  - i) Business plan development
  - ii) Introductions to venture capital investors
  - iii) Introductions to entrepreneurs
  - iv) Post-Incubation Facilities
    - a) Multi-tenant building

11. Depending on the experience of the business executives who will run the company all of the above services may not be needed or utilized. The following sections will describe the ways in which Emory currently provides technology transfer and commercialization support and the plans underway for expanding commercialization services and providing post-incubation facilities. Challenges in program planning, mistakes made and lessons learned are provided wherever possible. Additional information on the organizations and programs mentioned in this report can be found in Appendix 1.

### III. SERVICES AND FACILITIES CURRENTLY PROVIDED

#### Office of Technology Transfer (OTT)

12. The services provided by Emory's Office of Technology Transfer are representative of what you would see at most research-focused universities. These services include:

- Evaluating Invention Disclosures;
- Patent Filing;
- Licensing of Technologies; and
- Drafting and Review of Other Agreements

13. The first four bullets represent services that would be provided regardless of whether a disclosed technology is to be licensed to an existing company or a new spin-off company. Services provided by the OTT that are specific to spin-offs involve the drafting and review of agreements that are specific to the establishment of a new company spin-off companies such as option or equity agreements.

14. Although Emory's OTT has tried to provide assistance to spin-offs by introducing faculty inventors to entrepreneurs or venture capital investors, there has been no formal program in place to provide this type of support on a consistent basis. Emory is now in the process of determining how the next level of commercialization assistance could be provided and how this would fit into the existing OTT and Office of Research Administration organizational structure (see *In the Works* section for details).

#### IV. COMMERCIALIZATION SUPPORT

##### A. University Opportunity Fund

15. This fund was established by the University to assist spin-off companies, which are determined to be unique opportunities in which the University has a significant societal and potential economic reason to invest (e.g. GeoVax).

##### B. Emtech Biotechnology Development Corporation (EmtechBio)

16. The Emtech Biotechnology Development Corporation, a 501(c) 3 joint development between Emory and the Georgia Institute of Technology (Georgia Tech), was developed to provide commercialization assistance to life science spin-offs from both universities. The commercialization relationship between Emory and Georgia Tech is a natural extension of previous collaborations including a joint Department of Biomedical Engineering.

17. EmtechBio commercialization programs include a Seed Grant program and a wet-lab equipped incubator facility.

##### C. Seed Grant Program

18. The EmtechBio Seed Grant Program has as its primary purpose the funding of research projects at either Emory University or the Georgia Institute of Technology or joint projects involving both institutions. Emphasis is placed on projects with potential commercial applications. The grant program is funded through annual equal contributions from both institutions.

19. Permanent, full-time faculty or full-time research staff are eligible to apply for the seed grant. Recipients of grant funds from other sources are not eligible for funding of essentially equivalent research projects under this program.

20. Selection of proposals for funding will be based on equal weighting of criteria related to commercial potential and scientific merit. Following an initial screen to determine compliance with eligibility criteria, proposals will be subject to a two-step review process. An initial review will be conducted by a panel of scientists with relevant expertise. The final review and recommendation for funding will be undertaken by the Emtech Bio Scientific Advisory Board with final funding approval made by the Emtech Bio Board.

21. Grants may range from US\$75,000 to US\$100,000 and last for a one-year period. Extensions and renewals for a second year may be permitted subject to demonstrated progress and submission of a renewal application.

#### D. Incubator Facility

22. EmtechBio is located on the 42-acre Emory Briarcliff Campus. This start-up, biotech business incubator nurtures promising early-stage medical and related technologies for the development of clinically useful therapeutics and diagnostics. The incubator facility is managed with support from both the universities and the Advanced Technology Development Center (ATDC), a state-funded technology business incubation program. Funding for the facility and much of the scientific equipment was provided by the state of Georgia through GRA. The facility opened in 2000 and is currently filled to capacity. Details on the configuration of the facility and the services available are provided in the following table.

EmtechBio Emory / Georgia Tech Life Science Incubator	
Total Space	6,300 sq. ft.
Wet Lab/Office Modules	5 @ 1000 sq. ft.
Shared Space	1300 sq. ft.
Amenities	Scientific Equipment (centrifuges, microscopes) Business Equipment (copier, fax, guest workstation) High Speed data link, University Library, Conference Room Business Assistance (help with business license, shipping, mailing) * Flexible lease terms, equity in exchange for rent for qualifying companies
Current Vacancy Rate	0%
Resident Companies	6
New Potential Spin-Outs (Emory)	5 or more

#### V. EMTECHBIO LESSONS LEARNED

23. Development of the Emtech Biotechnology Development Corporation and the incubator facility were delayed during the planning and implementation process due to two organizational problems.

24. Lesson one: The organizational structure of the board included the CFO's from both universities as co-chairs with an additional ten board members. The result of this structure was a board that was too large and unfocused, making it difficult to accomplish the goals of the organization.

25. the solution was to restructure the board to have four voting members with additional non-voting advisors.

26. Lesson Two: The second problem that arose was that the vision and direction of the CEO chosen to head the incubator program were not aligned with the EmtechBio Board of Directors. This led to conflict over the type of companies that should be attracted as tenants and the fundamental purpose of the incubator program.
27. The solution to this problem was to hire a new CEO with a vision similar to the Board.
28. Existing Issues: Availability of space within the incubator facility is obviously an issue. Part of this problem is the lack of post incubation wet-lab space available in the Metro Atlanta real estate market. However there is also no pre-determined requirement defining when companies should vacate. In addition, there are no benchmarks or milestones defined for tenant company graduation. Although the incubator should be considered a temporary home for companies that are actively developing technologies, it could also be considered a safe harbor for companies that are going dormant. This creates a crowding problem in the incubators.
29. At the moment the EmtechBio incubator is full and the overflow demand for incubator space from Emory University spin-offs is being met by the ATDC Bioscience Incubator on the Georgia Tech campus.
30. In the current economic climate access to start-up venture capital is limited especially outside the more advanced biotechnology regions. If funding were more readily available, some of the incubator tenant companies may be able to seek larger space in the commercial real estate market.

## VI. PROGRAM IMPACTS

31. The commercialization programs currently provided by EmtechBio have been well received. It is still too early to quantify the impacts of these programs, however indications are that seed grants awarded for proof of concept research may result in new spin-offs that become incubator tenants. The incubator has been able to maintain full capacity and may soon be faced with turning away spin-off companies if the crowding problem is not resolved. However, no companies have graduated from the facility since it opened in 2000.

## VII. IN THE WORKS

32. This section describes the programs under development that are intended to expand Emory's ability to provide commercialization assistance to university spin-off companies.

### Commercialization Support

33. VentureLab is a program created by GRA and Georgia Tech to provide both human capital and monetary support to very early stage university spin-off companies. Guidance in the evaluation of a business opportunity is provided to faculty inventors with a commercializable idea and funds for proof of concept or prototype research are available on a grant basis. Modest funds are also available through VentureLab grants to compensate an

interim CEO or VentureLab fellow who may be brought in to develop the business plan and eventually run the company. A key component of the VentureLab program is proactively seeking out new spin-off opportunities from university research.

34. Without getting into a detailed description of the technology transfer process, the typical way in which a technology transfer office receives an invention disclosure is from a well-informed researcher taking the initiative to submit a disclosure form. As is the case with most universities, the technology transfer office staff juggles a variety of tasks and is usually too busy to proactively seek out faculty with potentially patentable discoveries.

35. The VentureLab program seeks to change that paradigm. Through a GRA grant Emory is currently conducting a VentureLab pre-assessment to evaluate the breadth of need for commercialization support at Emory. This grant is a pre-cursor to adapting a VentureLab program at Emory. This is the first pro-active attempt the university has made to seek out university technologies that may have commercial applications.

36. Project team members are using both quantitative and qualitative methods to identify faculty researchers who may be conducting research with potential commercial applications. Methods being used to identify these faculty members include:

- Evaluating historic patterns of sponsored research funding to identify investigators who have received significant amounts of funding over the past five years;
- Evaluating the nature of the research sponsored and the application of the funds (e.g. laboratory research versus clinical trials facilitation); and
- Interviewing research department heads to get input on which faculty should be targeted for interviews.

37. A short list of researchers will be interviewed to find out what type of research they are conducting, the stage of advancement of the technology, potential applications and the faculty member's awareness of the commercialization process. The goal of this assessment is to determine whether or not there are any technologies that could form the basis of start-up opportunities that OTT was previously unaware of. In the final round of evaluation, members of the OTT staff in cooperation with representatives from the business community will make decisions on the magnitude of the opportunities for spin-off companies. The goal is to end up with a tiered list of opportunities so that the university can focus on providing assistance to the ones most likely to have a shot at successful commercialization.

## VIII. CHALLENGE AND VISION

38. Concurrent with the VentureLab pre-assessment, Emory is evaluating the best way to provide expanded commercialization assistance to spin-off companies. The challenge will be to create an organization to support spin-offs beyond the typical technology transfer function that will complement the existing OTT and EmtechBio structures.



39. The services that may be provided by an expanded commercialization program include:
- VentureLab assistance for very early stage companies:
    - i) may provide support for evaluation of a business concept;
    - ii) access to GRAs VentureLab pool of grant funds for proof of concept research (an alternative to EmtechBio Seed Grant Program); and
    - iii) access to limited grant funding for Interim CEO, VentureLab fellow
  - Commercialization assistance for more advanced companies:
    - i) Education and assistance with applying for federal funding (SBIR/STTR);
    - ii) Introduction to venture capital (local and national funds, SEBio Investor Forum);
    - iii) Introduction to entrepreneurs /potential CEOs (which is challenging in the Georgia life sciences industry);
    - iv) Business evaluation assistance;
    - v) Intellectual property evaluation assistance; and
    - vi) Facilities (incubator and potentially post-incubation space).

#### IX. PROGRAM ASSETS

40. Some of the necessary components are already in place or could be easily accessed to help implement the expanded commercialization program. These assets include:

- Low cost office space at Briarcliff campus renovated facility (adjacent to EmtechBio incubator facility);
- Graduate students to provide assistance with evaluation of business opportunities and intellectual property positions. Students could be recruited from Goizueta Business School, Emory Law School and the Emory Life Sciences graduate and post doctoral fellow communities; and
- Two pools of grant funding for proof of concept research (EmtechBio and VentureLab).

41. In addition to existing assets that could be organized for use in a commercialization program, a position for a Program Director with extensive experience in life science start-up development, venture capital and entrepreneurship will be need to be created, funded and recruited.

## X. POST-INCUBATION FACILITIES

42. An additional limitation to the graduation of companies from the life science incubators is the lack of suitable post-incubation real estate space in the Atlanta Metro area. According to a study conducted earlier this year there is only 26,000 sq. ft. of suitable wet lab and office space commercially available on the market for companies emerging from incubators. The study also surveyed incubator residents about their projected space needs indicating that up to 70,000 sq. ft of space may be needed within the next three years.

43. Incubator tenants are typically limited to two modules or about 2,000 sq. ft of space. The result of the lack of commercially available space is that companies tend to stay in incubators as long as possible then either try to secure financing for leasehold improvements in the Atlanta market or move to another geographic area that has a supply of suitable real estate space.

44. The EmtechBio Board of Directors is considering ways in which post incubation space could be provided to companies that need to grow beyond the incubator. One solution is to build a multi-tenant facility on the Briarcliff campus, a property close to Emory's main campus. The former mental health facility property was sold to the University by the State of Georgia in 1998 for the intended purpose of developing a Biotechnology Development Center and other academic and research facilities.

45. To date the only new development on the 40-acre property is the installation of the modular EmtechBio incubator facility. Under consideration is the development of a 100,000+ sq. ft. multi-tenant building that could house companies as they graduate from the incubator facility. In order to mitigate the possibility of shell space remaining vacant, alternative tenancy could be comprised of university departments and commercialization support organizations.

46. Cost estimates for the building shell range from \$8.0 to \$10.0 million with tenant improvement costs ranging from \$50 to \$180/ sq. ft. depending on the use of the space. There are numerous challenges to developing the facility the least of which is locating the funds for the site planning, architectural and construction costs.

## XI. THE FUTURE OF UNIVERSITY SUPPORT FOR SPIN-OFFS

47. Research and development trends in the pharmaceutical industry have shifted in recent years to put more emphasis on licensing university technologies and acquiring smaller research-intensive biotechnology companies instead of funding in-house R&D. However, speculative licensing of unproven technologies is not common. Subsequently, universities are pressured to advance the research beyond a conceptual stage to make licensing opportunities more attractive. This, in addition to more entrepreneurially-conscientious faculty, creates increased pressure for the universities to provide more commercialization support.

48. Universities that are pressured to provide more support to advance these nascent technologies will be faced with the following resource demands:

- an increased need for pre-seed and seed investment in the form of federal SBIR/STTR grants, university investments for equity, seed investment funds and angel investors;
- an increased need for entrepreneurial and management support for research start-ups; and
- an increased need for physical infrastructure to support start-up companies.

## XII. CAUTIONS

49. While considering the numerous ways in which universities could support spin-off companies it is important to consider a couple of potential pitfalls; over-zealous creation of spin-off companies and losing sight of the university's primary mission.

50. Universities need to be cautious about creating too many spin-offs just for the sake of economic development. Some of these companies may just flounder and lay dormant instead of developing viable business plans for the commercialization of their technology portfolios. Careful evaluation of the true business opportunity needs to be done prior to creating a spin-off company.

51. In the rush to create high growth companies it may be easy for the involved parties to forget that the primary mission of most research-based universities is....research. An over-emphasis on commercialization may attract entrepreneurially savvy faculty at the risk of alienating researchers who focus on basic research with little interest in commercialization. Both types of researchers are necessary in a vibrant research institution.

52. Emory University, a private, research-focused academic institution with a strong and growing medical research department, does not have an economic development mission like other universities in the Georgia state university system. As it continues to develop and expand the level of support provided to spin-off companies, the university must balance commercialization efforts with its basic research mission.

53. The programs that have been established to provide commercialization assistance to spin-off companies have been successful in large part because of the collaboration between the public and private universities and state-sponsored organizations. Pooled funding for facilities, equipment, seed grants and human resources have made these programs possible. The success of the expansion of commercialization assistance programs will also rely on public private collaborations between the academic institutions, the state government and the business community.

[Annex follows]

ANNEX

A. Information on the Organizations and Programs Discussed in the Report

1. Georgia Research Alliance ([www.gra.org](http://www.gra.org)):

- The Georgia Research Alliance (GRA) is an internationally-acclaimed model for bringing business, research universities and state government together to create and sustain a vibrant, technology-driven economy for the state;

- The Alliance achieves its goals through strategic investments at the state's leading research universities in eminent scholars, collaborative research laboratories, national centers for research and innovation and technology transfer programs; and

- Since its founding in 1990, the Alliance has invested some \$350 million, which has helped to attract 40 Eminent Scholars, leverage an additional \$2 billion in federal and private funding, create nearly 3,000 new technology jobs, generate more than 80 technology companies and help established companies expand into new markets.

2. GRA Venturelab:

- A program of the Georgia Research Alliance (GRA), VentureLab is a strategy for enhancing and accelerating the process of spinning new technology-based enterprises out of university research. As a virtual center for technology commercialization, VentureLab provides a pathway from laboratory innovation to commercial market, offering assistance to faculty members throughout the process. VentureLab experts help evaluate the commercial potential of an innovation, connecting faculty members with experienced entrepreneurs who have the track record necessary to attract outside funding. The ultimate goal for GRA is to maximize the return on the state's investment in university research. VentureLab was piloted at Georgia Tech and has been adapted at the University of Georgia and the Medical College of Georgia. To learn more about VentureLab, as it has been implemented at Georgia Tech, visit ([www.venturelab.gatech.edu](http://www.venturelab.gatech.edu)).

3. EmtechBio ([www.emtechbio.com](http://www.emtechbio.com)):

- Emtech Bio is a partnership between Emory University and Georgia Institute of Technology;

- Founded in 2000, Emtech Biotechnology Development, Inc. offers laboratory space and use of scientific equipment to start-up and early-stage bioscience companies in a convenient location on Emory University's Briarcliff Campus in Atlanta, GA;

- Emtech Bio promotes company interaction by providing common meeting areas and development of business skills by hosting lunch-time seminars featuring speakers with expertise in relevant business fields such as Venture Capital, Public Relations and Intellectual Property Management. Emory University is also developing an internship program to pair graduate students from the Goizueta Business School and life sciences departments with Emtech companies for collaboration in areas such as market research and business plan development. The program is expected to yield valuable experience and insights for participants;
- in addition to laboratory space and business support programs for its affiliated companies, Emtech Bio supports a competitive grant program for Emory and Georgia Tech faculty. This program funds research with realizable commercial potential. The Emtech Bio grant program is now in its second year and is funded equally by Emory and Georgia Tech. The most recent request for proposals yielded 36 submissions. The Emtech Bio scientific advisory board chaired by Dr. Robert Nerem, Director of the Petit Institute for Bioengineering and Bioscience at Georgia Tech, is charged with review of these proposals;
- funding for the Emtech facility and much of the scientific equipment was provided by the state of Georgia through the Georgia Research Alliance; and
- Emtech's governing body is a four-person Board of Trustees, with two members appointed by the President of each founding university. A management contract with ATDC (the Advanced Technology Development Center) allows a lean executive staff by providing highly experienced CEO and COO talent on a part-time basis. Both Emory and Georgia Tech provide legal and financial advisors and the Treasurer is a well-respected member of the Emory Provost's staff.

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