Agenda

- Venture Economics and Performance Measurements
- Introduction to Bay City Capital
- Models for Innovation with Public / Private Partnerships
  - External Philanthropy disease focused academic consortia
  - Accelerators
  - Venture Capital Funds
Venture Economics

Limited Partners

LP1
LP2
LP3
LP4

Venture Capital Fund

Portfolio Companies

Company A
Company B
Company C

Capital calls are used to make investments in portfolio companies.

Liquidity events (IPO / M&A) create opportunities for the Fund to distribute cash (or publicly traded stock) to the LPs.
VC Performance

Timing of Returns

J-curve Phenomenon

Early Years
During the earlier years of a typical VC fund, the investor can expect negative returns and cash flows. Rationale: Losses due to expenses of managing fund + initial investments are carried at cost.

Middle Years
In the 3rd year, returns begin to improve as some investments are written up in value. Breakeven typically occurs around the 4th or 5th year.

Later Years
After year 5, liquidity events begin to occur as exit strategies are being executed. At this time, the fund’s return and cash flows are being realized.

Key performance measurement: Internal Rate of Return (“IRR”)}

IRR is the annualized effective compound rate of return. It incorporates both the amount and timing of cash flows.
Bay City Capital
A top performing life sciences investment firm

Global, diversified strategy ranging from seed to public, including innovation, distressed, and securitized asset investing

- Broad investment team with expertise across all areas of life sciences
  - Firm has been in operation for over 15 years, with 11 partners supported by over 20 investment professionals, venture partners, and distinguished scientific advisory board members

- Over $1.6 billion in total capital commitments across eight funds
  - $1.45 billion across five general life sciences funds, with three additional sector funds focused on strategic areas or geographies

- Long history of upper quartile performance

- Broad and deep experience building companies
  - Significant leadership roles as founders, directors, and/or executive officers of large cap pharma and biotech companies
Investment Team

- **Team longevity**
  - Our 11 investment / operating partners have been together for 9 years or more
  - A team of over 20 investment professionals

- **Global experience**
  - Born/raised in 8 countries; many international work assignments; 7 languages spoken

- **Unique understanding of capital markets**
  - Extensive experience in public market and debt transactions

- **Significant operational expertise**
  - Significant leadership roles as founders and directors of start-up ventures and as executive offers of large cap pharma and biotech companies

- **Distinguished Scientific Advisory Board members**
# Deep Domain Expertise: Therapeutics, Diagnostics, and Devices

Indications pursued by Bay City Capital’s portfolio companies

**CARDIOVASCULAR**
- acute MI
- atherosclerosis
- atrial fibrillation
- cholesterol reduction
- coronary artery disease
- dyslipidemia
- endothelial dysfunction
- high triglycerides
- hypertension
- peripheral arterial stenosis
- radiocontrast nephropathy
- vascular inflammation

**OPHTHALMOLOGY**
- age-related macular degeneration
- front of the eye diseases
- glaucoma
- macular edema

**ONCOLOGY**
- acute leukemia
- breast cancer
- colorectal cancer
- melanoma
- multiple myeloma
- myelodysplastic syndrome
- ovarian cancer
- prostate cancer
- small cell lung cancer
- other solid tumors

**METABOLIC DISORDERS**
- diabetes
- hepatic encephalopathy
- obesity
- sleep disorders

**RESPIRATORY**
- asthma
- COPD
- sleep apnea

**SURGICAL TOOLS**
- general surgery
- open hysterectomy

**DERMATOLOGY**
- acne
- Inflammatory skin diseases

**GENETIC DISORDERS**
- cystic fibrosis
- hemophilia
- muscular dystrophy
- urea cycle disorder

**CNS**
- acute pain
- anxiety
- attention deficit disorder
- chronic pain
- major depressive disorder
- migraine
- schizophrenia

**PLATFORM TOOLS**
- assays & kits
- clinical trials testing
- gene expression modulation
- genomic sequencing
- healthcare IT
- molecular diagnostics
- point-of-care diagnostics
- systems biology

**INFECTION DISEASES**
- hepatitis C
- HIV
- influenza
- community-acquired pneumonia
Broad Spectrum of Investments

**Sector – By $ Amount Invested**

- BioPharma: 52%
- Med Device: 14%
- Med Dx: 7%
- Nutrition/Ag: 7%
- HCIT: 6%
- Tools/Services: 3%
- Drug Discovery: 11%

**Initial Stage – By # of Companies**

- Seed: 11
- Early: 36
- Mid: 22
- Late: 8
- Public: 11
- Fund: 2

**Transaction types:** Create NewCos, Traditional VC, Turnaround/Restructuring, Public Companies

**Areas of strategic interest:** Innovation, Emerging Markets, Growth Capital
Models for Innovation: Philanthropy

Example – Pritzker Neuropsychiatric Research Consortium
Pritzker Neuropsychiatric Disorders Research Consortium

Diagnosis & Treatment

University of California at Davis
Stanford University
HudsonAlpha
University of Michigan
University of California at Irvine
Cornell University
Mission

- To discover the neurobiological and genetic causes of three major psychiatric disorders
  - Major Depressive Disorder (MDD)
  - Bipolar Disorder (BPD)
  - Schizophrenia

- To identify biomarkers for better diagnosis and novel targets for their treatment

- To ensure application of these discoveries in the development of diagnostic and treatment strategies
Background and Members

- Pritzker family funding started in the late 70’s

- The Pritzker Network
  - From 1996 to 2000 - Cornell, Michigan, and Stanford
  - Network was interdisciplinary, collaborative and based on established relationships

- The Pritzker Consortium
  - Established in 2000 and extended in 2011 for another 5 years

Dr. Jack Barchas
Scientific Approach

- Multidisciplinary and integrated approach that includes neuroscientists, psychiatrists, geneticists, statisticians, and informaticians

- “Circuit Neuromics” approach that requires the integration of genetics, cell and molecular biology, functional neuroanatomy and behavioral and clinical analyses

- Brain Bank from subjects with MDD, BPD, schizophrenia and controls

- Human clinical samples from living, well-diagnosed psychiatric patients and controls

- In depth in animal and in vitro models

- Approximately two hundred publications in premier journals, such as Nature, Science, Proceedings of the National Academy of Sciences, and leading specialty journals in Neuroscience, Genetics, and Psychiatry
Patent Strategy

- All investigators and institutions are cooperating under a common option / license / intellectual property agreement

- Tasked with ensuring Consortium inventions will be protected and commercialized, preferentially through partnerships with industry

- The Patent Committee is comprised of representatives from Stanford University, Kilpatrick Townsend, members of the Pritzker Fund and the Scientific Liaison (BCC)

- Several patents and patents pending, in US and globally, have derived from Pritzker Consortium Discoveries
Business Goals

- To develop Consortium IP into a self-sustaining “enterprise” capable of generating continuous funding for ongoing research activities

- To build relationships with companies or outside organizations focused on the CNS space or related fields – ideally with those developing technology that addresses Consortium needs

- For more information regarding General Accomplishments and Infrastructure and Major Scientific Discoveries, please visit their website:

  www.pritzkerneuropsych.org
Models for Innovation: Academic Accelerators

Example – UCSF
UCSF Facts

- UCSF has been the source of 78 biotech start-ups (e.g. new pharmaceuticals, biotechnology, medical device firms) and has helped “incubate” another 27 firms at its Mission Bay campus.

- UCSF alone accounts for more than half of all life sciences-related building space in San Francisco with about 1.7 million square feet dedicated to research uses.

- The University of California as a whole was the leading biotechnology patenting organization in the US from 1977 to 2003 with approximately 1,585 patents (UCSF accounted for about 95% of the UC total). UCSF alone accounts for about 6% of the total academic licensing revenue in the US.

- UCSF licenses over 30% of the inventions it evaluates.

  As of June 30, 2010
  - 1,416 active inventions under management
  - 711 active US patents
  - 347 active licenses
  - 13 drug and medical device technologies in clinical development
How Has it Happened?

- UCSF’s success is based on public / private partnerships in adjacent biomedical research institutes, creative collaborations with industry and government, active involvement by the city, direct participation by venture capital and funding mechanisms, an entrepreneurial environment, and novel ideas such as:

  - 2000: **QB3** –
    A collaboration among the California Institutes for Science and Innovation at UCSF, UC Berkeley, UC Santa Cruz established to accelerate discovery and innovation

  - 2006: **Clinical and Translational Science Institute** –
    A cross-school, campus-wide institute to facilitate rapid translation of research to improvements in patient and community health

  - 2011: **Office of Innovation Technology & Alliances** –
    Supports innovation through effective advancement and management of IP, and by identifying opportunities and building relationships with a focus on developing novel alliances that advance UCSF’s core mission

- Culture driven by entrepreneurism
QB3’s mission

- We are suffering an innovation crisis that only startups can solve
- QB3 wants to become the preeminent biotech incubator in the world.
- Iteratively identify and lower the barriers to startup success:
  - Lean Biotech Startup
QB3

Lowering barriers to innovation

**Industry Alliances**
- Sponsored Research
  - Pfizer ($3.5M/yr)
  - J&J

**QB3 Bridging the Gap**
- Proof-of-Concept
  - $1M/yr

**QB3 Startup in a Box**
- Virtual
  - >70 Co/yr

**QB3 Garage**
- Operational
  - 59 Co's in 5 sites

**Mission Bay Capital**
- Funding
  - $11.3M fund
QB3 Startup In A Box

13 months
87 companies
17 already operational
QB3

QB3 Accelerator Service Providers

Vendors: Fisher Scientific, SIGMA-ALDRICH, CORNING

Accounting: Rosryan

Payroll/Benefits: TriNet

Insurance: Arthur J. Gallagher & Co., BayPoint Benefits

HR Staffing: Aerotek, VentureLoop

CROs: ricerca, Covance, ChanTest, LyChron, P-WuXi AppTec
Not Just UCSF…

- Most major research-based academic institutions have or are establishing centers similar to those at UCSF

- “Partnering with the Professor” highlights relationships between business and academia to sponsor innovation (*Nature Biotechnology*, October 2012, Volume 30, Number 10)

*Pfizer’s Centers for Therapeutic Innovation (CTI)* – An initiative in which Pfizer partners with academia via shared bench-and-clinic time involving Pfizer scientists and both basic and clinical scientists at their partnered academic sites.

  - Weill Cornell Medical School is highlighted in this article with Dr. Kathy Hajjar’s program referenced
BAY CITY CAPITAL

Investing in Life Sciences

Models for Innovation: Venture

Example – Bay City Capital Innovation Fund
Due to significant unmet medical needs, most drugs that received approval yielded substantial profits to justify the risk of investment.

Life sciences innovation primarily originated from basic research conducted in university and government institutions.

Translating innovation from basic research into drug candidates was for the most part funded by the venture capital industry.

As development progressed, risk was reduced and expenses increased.

A funding shift occurred from venture capital to public investors and large pharma.

VC served as an engine for translating research into pharma projects.
The Current State of the Healthcare Industry

Innovation

- Innovation is still generated by universities and government
- Growing cache of untapped innovative discoveries
- Pharma research funding has decreased
- Venture funding has decreased

Development

- More complicated and conservative regulatory environment
- Larger size, complexity, and cost associated with clinical trials in US/EU
- Pharma, public investors, VC are increasingly risk averse
- Public investors have abandoned development stage companies; VCs are stuck/leaving
- Pharma is focusing on commercial opportunities
- Development funding is decreasing and being exported

Regulatory Approval

- US healthcare reform – Pricing affected by proof of improved outcome and cost benefits (Innovation)
- Pharma blockbuster products facing patent cliffs
- Still many areas of unmet medical need
- Pharma sales growth: <5% in developed countries and >20% in emerging markets

Result: Fewer innovative projects are moving into pharma
Fund Evolution

GENERAL LIFE SCIENCES FUNDS

FUND I

1997
$148 million

FUND II

1999
$201 million

FUND III

2001
$252 million

FUND IV

2004
$350 million

FUND V

2007
$500 million

BAY CITY CAPITAL EXITS (FUNDS I – V)

Average Performance by Category

<table>
<thead>
<tr>
<th>Entry Point</th>
<th># of Exits</th>
<th>Investment Multiple</th>
<th>Holding Period</th>
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<tbody>
<tr>
<td>Seed/Early</td>
<td>22</td>
<td>2.4x</td>
<td>5.8 years*</td>
</tr>
<tr>
<td>Mid-Stage</td>
<td>8</td>
<td>1.3x</td>
<td>5.3 years</td>
</tr>
<tr>
<td>Late/Public/Distressed</td>
<td>12</td>
<td>3.8x</td>
<td>3.1 years</td>
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</tbody>
</table>

* Recall the J-curve
Recent Partnership Trends

- Companies are increasing early-stage product licensing
- In terms of therapeutic area, oncology and CNS have been the most popular areas for licensing

Partnerships by Stage of Development

- Preclinical: 69
- Phase 1: 31
- Phase 2: 49
- Phase 3: 38
- Marketed: 6

Partnerships by Therapeutic Area

- Oncology: 26%
- CNS: 21%
- Multiple Therapy Areas / Other: 10%
- Infectious Disease / Vaccines: 10%
- Autoimmune: 9%
- Endocrinology: 7%
- Cardiovascular: 6%
- Respiratory: 4%
- Hematology: 3%
- Gastrointestinal: 3%
- Ophthalmology: 21%
- Dermatology: 10%
- Dermatology: 1%

Source: EvaluatePharma
Exploiting Opportunities Within the New Paradigm

Rather than handing off assets from one stage to the next and hoping that the final product is desired by pharma, the Innovation Fund will:

1) Align and integrate academia, corporate partners, and venture funding.
2) Transform innovation into commercial opportunities that match the needs of the pharma and diagnostic industry.
3) Leverage a capital efficient (virtual) model with operational and strategic advantages provided by stakeholders.
4) Designed to transfer viable assets to diagnostic and pharma partners after proof of concept.
Strategy Gives Stakeholders a Differentiated Approach to Innovation

Leveraged capital and extensive network provides stakeholders with ability to increase their global access to innovation.

- **Source of early-stage, innovative assets / access to the latest tools & technology available in a rapidly changing environment**
- **Provides access to and greater engagement with patients**
- **Provides clear guidance regarding reimbursement in an environment of increased scrutiny**
- **Natural symbiotic relationship between preclinical & clinical CROs**
- **Seeking new paradigms to reduce cost and get to faster, more-informed decisions**
- **Access to novel biomarkers and companion diagnostics to provide personalized medicine approach to clinical trials**

**ACADEmia / RESEARCH**

**PAYors**

**PROVIDers**

**CROs**

**DIAGNOstics**

**BIO PHARMA**

**VENTURE**

Bay City Capital
Distinguished Scientific Advisory Board and Advisors

- Cross-disciplinary board that supports due diligence, advises portfolio companies, serves as managers and board members, develops new businesses, and brings new technologies to the attention of the firm

- Jeff Friedman, MD, PhD
  Rockefeller University

- E. Rolland Dickson, MD
  Mayo Clinic

- Fred Gage, PhD
  The Salk Institute

- Alan Glassberg, MD
  UC San Francisco

- Paul Greengard, PhD
  Rockefeller University

- Lester Kaplan, PhD
  Allergan

- Ronald Krauss, PhD
  Children’s Hospital, Oakland

- Richard Lerner, MD
  Scripps Research Institute

- Arthur Levine, MD
  UPMC

- Richard Myers, PhD
  Hudson-Alpha Institute

- Mervyn Turner, PhD
  Merck & Co.
Bay City Capital’s Innovation System: Academic Partners

OPERATIONAL / STRATEGIC PARTNERS
Each of these partners provide deep collaborative interactions with Bay City Capital:
- invaluable strategic operating partners
- world-renowned clinical and technical experts
- trusted deal sourcing, due diligence, and portfolio management collaborators

ACADEMIC NETWORK
Bay City Capital has developed an academic network of universities and medical institutions. We intend to add top global universities and institutions to this network, including Japan and China.
ACADEMIC NETWORK

ACADEMIA / RESEARCH NEEDS:
A BETTER WAY TO MOVE INNOVATIVE PROJECTS FORWARD

Innovation Fund provides the resources of QB3 “Start-up in a Box” but on a larger scale

BENEFIT TO ACADEMIA
- Development and exploitation of intellectual property
- PI involved in long-term interactions
- Equity and other financial incentives for PIs and universities
- Fund partners are positioned to complement and integrate the local academic resources (e.g. Centers for Therapeutic Innovation)

BENEFIT TO THE STAKEHOLDERS
- Common license agreement with pre-negotiated terms
- Academic network provides a source for early-stage assets
- Academia/PI will be a collaborator, accelerating technology transfer and preclinical POC work
Consolidating & Integrating the Stakeholders: Academia / Research

*Hudson-Alpha is an Operational / Strategic Partner*

- **Hudson-Alpha**
  - One of the most experienced and innovative genome centers in the world

**Benefit to Hudson-Alpha**
- Development and exploitation of intellectual property
- Access to partner clinical resources
- Translating discoveries into commercial opportunities

**Benefit to the Stakeholders**
- Access to top experts in the field
- Access to the latest tools technology
- Development of cutting-edge genetics and genomics, with a sophisticated bioinformatic enterprise
PROVIDERS NEED:
TO DELIVER MORE EFFECTIVE & EFFICIENT HEALTHCARE TO THEIR PATIENTS BY ACCESSING INNOVATIVE TECHNOLOGIES AND SOLUTIONS

BENEFIT TO PROVIDERS
- Access to innovative technologies
- Ability to advise on development of innovative products to satisfy the needs of providers
- Access to Hudson-Alpha genome center
- ACO / Patient outcomes

BENEFIT TO THE STAKEHOLDERS
- Increased likelihood that product development efforts are directed toward the needs of the end users: healthcare providers
- Accessing clinical resources
- There are currently ~80 active clinical studies in oncology at UPMC

Consolidating & Integrating the Stakeholders:
UPMC is an Operational / Strategic Partner
Provider Partner

Leading global hospital-based biomedical research institute where basic research connects with clinical care

- $9 billion in revenue
- More than 20 hospitals operating ~4,000 beds
- More than 400 service locations
- More than 50,000 employees
- 200,000 admissions
- Nearly 1.5 million members covered by UMPC Health Plan products
- Committed $145 million to support biomedical research
- One of the largest cancer care delivery systems in the US and rapidly expanding internationally

- Focus on the patient
- Best clinical practices
- Clinical outcomes
Consolidating & Integrating the Stakeholders: 
*Quintiles is an Operational / Strategic Partner*

**QUINTILES DRUG DEVELOPMENT PARTNERSHIPS:**
PHARMA-GRADE DEVELOPMENT EXPERTISE AVAILABLE ACROSS THE VALUE CHAIN TO PROVIDE EVERY ASPECT OF CLINICAL DEVELOPMENT AND COMMERCIALIZATION

**BENEFIT TO QUINTILES**
- Means of transforming business model
  - Traditional business model focuses on *Tactical Execution*, which misaligns incentives and is unsustainable and inefficient
  - Risk-based partnership models focus on *Integrated Knowledge-Based Product Development* in which execution AND outcomes are harmonized to create value
  - Capitalized partnership models allow expertise and experience in Clinical, Commercial, and Consulting to be delivered as collaboratively managed solutions

**BENEFIT TO THE STAKEHOLDERS**
- Execution expertise and experience for all phases of development
- Virtual development model to enhance efficiency and effectiveness of delivery
- Flexible deal structures with “skin-in-the-game” based upon execution and outcomes
- Drug Development Network (DDN) readily available to enhance needed specialty expertise
Consolidating & Integrating the Stakeholders: Diagnostics

**DIAGNOSTICS NEEDS:**

**NOVEL BIOMARKERS & COMPANION DIAGNOSTICS**

**BENEFIT TO DIAGNOSTICS**

- Differentiated integrated innovation organization focused on validating biomarkers for therapeutics development
- Opportunity to co-develop companion diagnostics for novel therapeutics
- Operational / Strategic partners provide intellectual leverage
- Capital efficiency and financial leverage: targeted returns 2-3x cash-on-cash

**BENEFIT TO THE STAKEHOLDERS**

- Alignment of interests occurs between biopharma and diagnostic partners earlier and throughout the process
- Increases the likelihood that development and outcomes are in line with expectations
Consolidating & Integrating the Stakeholders: BioPharma

**BIOPHARMA NEEDS:**
TO POPULATE THEIR PIPELINES WITH INNOVATIVE PRODUCTS

**BENEFIT TO BIOPHARMA**
- Differentiated integrated innovation organization focused on therapeutic areas relevant to the biopharma company
- Operational / Strategic partners provide intellectual leverage
- Capital efficiency and financial leverage: targeted returns 2-3x cash-on-cash

**BENEFIT TO THE STAKEHOLDERS**
- Alignment of interests occurs with the biopharma partner earlier and throughout the process
- Increases the likelihood that development and outcomes are in line with expectations
Consolidating & Integrating the Stakeholders: Payors

Payors Need:
To reduce costs by reimbursing more effective healthcare

Benefit to Payors
- Ability to advise on development of innovative products and services that make healthcare delivery more efficient and cost-effective
- Increased likelihood for therapeutics addressing unmet medical needs rather than “me-too” incremental products

Benefit to the Stakeholders
- Increased likelihood that product development programs are addressing appropriate patient populations and will be reimbursed
Increasing the Likelihood of Success

- Innovation comes from a variety of sources
- All of the stakeholders in the Fund are responsible
- This structure is differentiated and designed for best practices risk assessment and decisions

**SOURCING INNOVATION**

- **ACADEMIA/RESEARCH**
  - Hudson-Alpha & Academic Network

**VENTURE**
- Bay City Capital

**BIO PHARMA**

**PROVIDERS**
- UPMC

**PAYORS**
- CROs
  - Quintiles & Preclinical CRO

**DIAGNOSTICS**

**TRANSLATING INNOVATION**

- Consolidate, integrate, and manage stakeholders with complementary skills to increase the likelihood of success
- Deep experience, strong track record of producing positive results
- Adaptively managing drug development portfolios to maximize proof-of-concept, while decreasing time and cost
- Right Patient → right clinical trial → right drug
BAY CITY CAPITAL

Investing in Life Sciences

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