OCR in a Nutshell

ABOUT
Since its founding in 1982, the Yale Office of Cooperative Research (OCR) has built a significant portfolio of inventions and patents and has grown into an engine of regional economic development. Its mission is to facilitate the translation of research from Yale’s labs into products and services that benefit society. OCR is recognized as a leading force for catalyzing economic growth by identifying, counseling and nurturing early-stage technologies and guiding the transition into robust companies. The genesis of university technology transfer offices was birthed from a visionary piece of legislation called The University and Small Business Patent Procedures Act, better known as “The Bayh-Dole” Act that became law on December 12, 1980. This monumental legislation recently celebrated its 40th anniversary by commemorating its history and the transformative benefits to American innovation, society at large, and the economy.

MISSION
- Guide and support Yale researchers in the advancement of their innovations
- Foster a culture of innovation, entrepreneurship & partnership across the Yale community
  - Enhance the research reputation of the university.
  - Assist Yale in recruiting and retaining the best faculty, staff, and students
  - Catalyze local economic development through new venture startups
2021 Innovation & Entrepreneurship

**Yale Office of Cooperative Research**

**ENTREPRENEURIAL ACTIVITY**
- 11 startups launched
- $53.2M raised in new venture financing (NEW RECORD)
- 4th IPO in four years straight
- Over the past 6 years, 60 new ventures have raised over $3.7 billion in capital
- Doubled the average number of venture capital-backed startups formed annually from 5 to 10+

**BLAVATNIK FUND**
- 33 funded projects
- 43 total awards
- Highest percentage of women quarterfinalists of all five years
- 12 ventures launched with $108M raised to-date

**PATENT ACTIVITY**
- 247 patents issued (178 US Patents + 72 International)
- 1026 patents worldwide (US 387 + International 1043) across 34 countries

**DEALS**
- 83 deals for financial consideration
- 12 are considered major deals (i.e., potential for $1M in royalties or impacting 1 million lives)
- 13.8 deals per business development associate

**SPONSORED RESEARCH**
- 31 sponsored research agreements & cooperative research agreements
- $11.0M in new funding
- Over past 5 years, executed an average of 29.8 corporate & sponsored research agreements with an aggregate value of $414M

**INVENTION ACTIVITY**
- 230 inventions disclosed
- 90 provisional applications
- 214 international applications
- 55 PCT applications
The Commercialization Process

- Evaluation of Inventions
- Patent Protection "Know-How"
- Licensing
- New Ventures
- Corporate Partnership
Since 2000:

- > 75 startups with over $2 billion in venture capital
- another $7 billion in public equity financing based on Yale intellectual property have taken root in New Haven.
- $3.7B in Venture Capital Investment (2016-2021)
- 1626 Active Patents Worldwide
- 4 IPOs in 4 years
- 2 INDs in 2020
The Yale Innovation Summit takes place annually in May, and is the largest entrepreneurship event on Yale's campus, and the largest gathering of venture capital investors in Connecticut. Dozens of startups founded by Yale biotech and tech innovators are joined by top ventures from around the state to pitch their ideas in a "Shark Tank" format to prospective industry partners and investors. The Yale Innovation Summit offers unparalleled networking, education, and inspiration to the entire entrepreneurial ecosystem.

Yale Lifesciences Pitchfest is an annual event that takes place in December where the top biotech and physical sciences opportunities developing within Yale present their 5-minute pitches to dozens of industry judges and an audience of hundreds. On average, over 100 companies and investment firms are represented.
$25M from The Blavatnik Family Foundation
- maximize commercial potential
- enable potentially life saving applications
- investigator initiated research
- up to $300K per project
- fellowship program

Expanded into digital health/healthcare IT in 2021

Not just an award – a learning opportunity
IDEA is an umbrella program under which various programs operate to serve Yale faculty and students interested in entrepreneurship and commercialization opportunities. Including:

- **3 Fellowship Programs**: Y-AID, Canaan-Yale Fellows and Blavatnik Associates.
- **Entrepreneurs-in-Residence**: A network of over 60 EIRs have deep operational experience turning new technologies to new businesses. These experts act as an early “sounding board” for Yale innovators contemplating a new startup.
- **Educational Series**: Yale Startups in Formation (YSIF) and IP Insights are uniquely designed to help the Yale community learn various aspects of entrepreneurship and the commercialization process.
Initiated in 2020
A program dedicated to supporting women and other underrepresented groups in science & entrepreneurial pursuits.
Ensures all Yale ideas are explored
Front load the entrepreneurial pipeline with more diversity
Host individual events to highlight minority groups and forge relationships
Host a monthly podcast to highlight Yale innovation and entrepreneurship ecosystem
Sampling of Entrepreneur Spotlights
Associate Research Scientist in Epidemiology (Microbial Diseases) at the Yale School of Public Health

- The SalivaDirect™ test was developed at the Yale School of Public Health (YSPH) to enable communities and labs to establish affordable and equitable SARS-CoV-2 testing programs by leveraging their existing resources. We believe that only by mobilizing all interested parties around the common frameworks and principles can we collectively deliver effective and sustainable testing programs nationwide.
- OCR spearheaded the designation of 100 labs in 36 states during 2020.
Arvinas

- Craig Crews - Lewis B. Cullman Professor of Molecular, Cellular, and Developmental Biology founded Arvinas to develop a new class of drugs based on protein degradation.
- Arvinas raised $60M in Venture Capital and has over $1B in pharma partnerships
- In 2018, they raised $120 Million in IPO and had 2 drugs in Phase I clinical trials
Barbara Ehrlich, a professor of pharmacology and of cellular and molecular physiology at Yale School of Medicine and a 2020 Blavatnik Fund award recipient, is Scientific Founder of Osmol Therapeutics.

Data from preclinical studies conducted by Osmol show that pretreatment with OSM-0205 prevents neuronal damage from taxanes in mice by preventing the off-target intracellular calcium surge caused by these chemotherapy agents.

In May 2021, Osmol announced that it has initiated Investigational New Drug (IND) enabling studies to develop a therapy to prevent chemotherapy-induced peripheral neuropathy (CIPN). A phase 1 clinical study is projected to begin in 2022.
RIGImmune

- Anna Marie Pyle and Akiko Iwasaki are Co-Founders of RIGImmune and Yale faculty.
- Dr. Pyle oversees structural biology, synthesis, biochemistry and molecular design of RIG-I agonists.
- Dr. Iwasaki oversees experimental immunology, virology and immuno-oncology.
- As of 2021, they are planning to close a significant seed round.**

**Confidential
Biohaven Pharmaceuticals

• CEO, Dr. Vlad Coric is an Associate Clinical Professor of Psychiatry at the Yale School of Medicine.

• Biohaven is a clinical-stage biopharmaceutical company with proven leadership in industry and academic settings. Their portfolio is comprised of innovative, late-stage product candidates targeting neurological and neuropsychiatric diseases, including rare disorders.

• In May 2019, they raised $168 million in IPO
Aero Therapeutics

- Anjelica Gonzalez Inventor & Co-founder, Biomedical Engineer & Yale Faculty
- Anjelica Gonzalez pitched to the full Blavatnik Fund at Yale board on 12 May 2021 and was awarded $150,000.
- Aero met with the FDA in March 2021 and received guidance on steps required for regulatory approval in the US through the Pre-Submission process. They will spend the Blavatnik funds on completing the steps needed to get PremieBreathe through FDA approval within a year's time.
KLEO Pharmaceuticals

- Dr. David Spiegel – KLEO was founded in 2016 by Dr. David Spiegel and Roy Prieb to translate Dr. Spiegel's research in small molecule immunotherapies at Yale University into clinical treatments.
- KLEO has raised $53M in financing. Acquired by Celldex in Nov. 2016 for $235M.
- In February 2020, received Investigational New Drug (IND) authorization to proceed from the U.S. Food and Drug Administration (FDA) to initiate a safety and tolerability clinical study.
They were established to provide first-in-class therapeutics to treat damage to the central nervous system (CNS). ReNetXBio has raised $25M, launched a Phase 1/2 clinical trial proof of concept trial and was granted "Fast Track Designation" from FDA.

Stephen Strittmatter, MD, PhD, the Vincent Coates Professor of Neurology and co-founded the Yale Program in Cellular Neuroscience, Neurodegeneration and Repair, is the scientific founder & a current advisor at ReNetX Bio.
Robert Schoelkopf, a Co-Founder of QCI and its Chief Scientist, is the Sterling Professor of Applied Physics and Physics at Yale University.

They raised $18M in Series A funding, co-led by Canaan and Sequoia.

In January 2019, QCI officially opened its New Haven development and testing facility for quantum computing, which includes 6,000 square feet of state-of-the-art laboratories and in-house manufacturing; it will house over 20 scientists and engineers.
Cybrexa Therapeutics

- Chief Scientific Advisor & Scientific co-founder is Ranjit Bindra, MD, PhD, a physician-scientist and biotech entrepreneur at the Yale School of Medicine.

- They have raised $21M in financing.

- The Company’s lead candidate, CBX-12, an alphalex™-exatecan conjugate, is expected to enter Phase I in 2021 in advanced solid tumors. Cybrexa also has other preclinical toxin conjugate programs as well as synthetic lethality programs.
Richard Flavell, HHMI Investigator, and Noah Palm, Asst. Professor of Immunobiology - founded a microbiome startup, Artizan Bioscience, to develop therapeutic vaccines for IBD.

NextCure

- Lieping Chen - United Technologies Corporation Professor in Cancer Research & pioneer of Immuno-checkpoint modulators (Opdivo of BMS and Keytruda of Merck) - founded NextCure to develop new cancer drugs.

- Raised a record $67M Series A funding

- In Nov. 2018, announced the completion of a $93 million series B equity financing

- NextCure is now a publicly traded company since its IPO in May of 2019
Proteolix

- Co-Founded by Craig Crews - Lewis B. Cullman Professor of Molecular, Cellular, and Developmental Biology, Proteolix, Inc., was a private biotechnology company founded in 2003.

- Proteolix was acquired by Onyx Pharmaceuticals in 2009 for $810 million (nominal value).
Isoplexis has developed a single cell immunoassay and software that provides in-depth understanding of immune cells and cancer cells based on technology from Yale professor Rong Fan, Associate Professor of Biomedical Engineering.

- Team was formed by matching Fan’s technology with a School of Management student, Sean Mackay, the CEO and cofounder

- In May 2019, they closed a $25 Million Series C Round bringing total funds raised to over $66 Million
Achillion Pharmaceuticals

- Tommy Cheng - Henry Bronson Professor of Pharmacology - launched Achillion to develop improved antiviral compounds.

- Achillion raised $50M in venture funding & another $41.8M through direct offering.

- In Dec. 2016 they reached a clinical milestone for their chronic hepatitis C drug.

- In Dec. 2019, they were acquired by Alexion Pharmaceuticals.
Yiviva

- Developing therapeutics, inspired by botanical medicines, to treat chronic diseases and cancer. Lead candidate cancer drug is based on an 1800-year old traditional Chinese medicine formula.

- Yiviva’s pipeline is based around patented research from Dr. Yung Chi Cheng, the Henry Bronson Professor of Pharmacology at Yale and Chairman of the Consortium for the Globalization of Chinese Medicine.

- Cheng is the scientific founder of past venture successes Achillion and PhytoCeutica.

- The company won an Innovation Award at the US-China Health Summit in 2016
Joseph Schlessinger - William H. Prusoff Professor, Chairman of the Department of Pharmacology - founded Kolltan to develop new cancer drugs.

- Kolltan raised $80M in equity financing.
- Acquired by Celldex in Nov. 2016 for $235M.