Dr. Gregory Weiss, Co-Founder
Dr. Reg Penner, Co-Founder
Reuben Richards, CEO (rrichards@phagetech.com)
PhageTech’s Vision

Create effective, inexpensive, point-of-care diagnostics to disrupt and improve healthcare and patient outcomes using phage-based detection of diseases

Transistor, 1950 @ Bell Labs

Phage sensor, 2006 @ UCI
PhageTech’s Vision

Create effective, inexpensive, point-of-care diagnostics to disrupt and improve healthcare and patient outcomes using phage-based detection of diseases

Phage sensor, 2017 @ PhageTech, Inc.
Disrupting Immunodiagnostics

Current Immunodiagnostics

- Late, slow, expensive
  - Tests ordered as a result of, and often testing for, the appearance of physical symptoms
  - Physical or macro level symptoms
  - Invasive
  - Fluid is collected, sent to a 3rd party lab, results take days
  - Antibody-based – long testing time and often requires refrigeration

PhageTech Vision

- Early detection, fast, low cost
  - Tests ordered as a screening tool
  - Molecular level detection
  - Non-invasive sample collection
  - Immediate results at the point of care
  - Bacteriophage-based – dry, enables portability and shelf stability of the device
Current diagnostics based on antibodies

• Pitfalls of antibodies
  – Costs
  – Typically require refrigeration
  – Long development times
  – Difficult scaling
  – Lots of existing IP
Our History

2004
first grant awarded

2006
first working sensor

2014
PhageTech founded

2015
2016
2017

>12 publications (JACS, Analy. Chem., etc.)
9 patents filed (5 granted, 4 pending),
>$2M in grant funding (UCI, NSF, NIH)
Our History

2004
first grant awarded

2006
first working sensor

2015
PhageTech founded

2014
PhageTech hires first employees

2016
Series A funded $4.2M

2017
Bladder cancer grant ($1M)
Goals Identified 2 Years Ago

1. Prepare phage @ large scale with low batch-to-batch variability by statistical measurements
2. Low sensor to sensor variability
3. Dry storage of sensors
4. Measurements in urine
5. Address interfering substances found in urine
Our biosensor

Biosensor in flow cell

HSA detection with 21 sensors


Confidential – May Not Be Distributed Without PhageTech’s Consent
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PhageTech Employees

Reuben Richards, CEO, Board Member

Phillip Tam, Ph.D., Senior Research Scientist

Marie True, Research Scientist

Jeffrey Briggs, Research Associate

Kosuke Seki, Research Associate
Members of the Board

- Reuben Richards, CEO
  Board Member

- Paul Cate,
  Board Chairman

- Jack Van Berkel,
  Board Member

- Rich Henson, Board Member
  Co-Founder

- Gregory Weiss, Board Member
  Co-Founder
Be part of this transformation

Conventional diagnosis  Now at PhageTech  The future with PhageTech
Funding goals

• Current funding sufficient through FDA pre-submission and clinical trial
• Series B investment in first half of 2018 to fund:
  • Full FDA submission and next generation technology
  • Develop strategic partnerships
    • Fund marketing, distribution, and commercialization

• Contact information: rrichards@phagetech.com
Appendix
Capitalization

• Total of $4.2m in investor funding raised
• September 2016: Grant received from the National Cancer Institute for ~$1m over 3 years in collaboration with U.C. Irvine
  — From Peer Review:
  “...extremely innovative in that the unique technology incorporates a modified virus into an electronic circuit. Although the science is complex, the ultimate product is an elegant and robust strategy to monitor for bladder cancer recurrence. The investigators are exceptional with complementary expertise to carry out the proposed research... The phage and peptide ligands are robust and stable... This is a major advantage over other approaches that use antibodies...”
Intellectual Property

• Selected listing of patents filed by UC Regents and licensed to PhageTech
  – 8,513,001 “Method and apparatus for target detection using electrode-bound viruses” Aug 2013
  – 8,525,237 “Electrically conductive polymer nanowires with incorporated viruses” Sept 2013
  – 8,986,655 “Compositions, Devices, and Methods related to Prostate-Specific Membrane Antigen” March 2015
  – 15/121,153 “Controlled Binding by Phage using Chemically Synthesized Wrappers” Filed February 2015 Pending
  – 15/287,489 “Pegylated Phage for Specific Molecular Recognition of heterogeneous surfaces, including Cancer Cells” Filed October 2016 Pending
  – 62/436,333 “Composite biosensor for Human Serum Albumin” File

• US Trademarks for PhageTech™ and BioConductor™

• Future Patent work planned by co-founders:
  – Biosensor enhancement patents
  – Production process trade secrets
Selected Advisory Board Members

- Dr. Howard Robin, Chief Technology Officer, Medical Director at Molecular Response. Board certified in anatomic and clinical pathology. Dr. Robin is a pathologist and former clinical laboratory medical director at Sharp Memorial Hospital and Pacific Rim Pathology Lab in San Diego, CA.

- Dr. Daniel P. Kolk, Senior Director Product Development, Hologic. 30 years experience with developing medical devices and securing FDA clearances. Hologic; DermTech Int; Gen-Probe; and NIH Post-Doctoral Fellow, UCSD School of Medicine

- Dr. Frank Chisari – Professor, Scripps Research Institute (retired) With Scripps since 1998 and most recently Professor and Head, Laboratory of Experimental Virology, Department of Immunology and Microbial Science.

- Dr. Jeffrey Yoshida - Director of urologic oncology at Hoag Family Cancer Institute. Dr. Yoshida is Board-certified in urology and has practiced as a urologic oncologist since 2004. Past Associate Clinical Professor, Urologic Oncology; city of Hope Cancer Center. He has authored eight publications on the subject of urological cancers and is an expert on robot-assisted radical prostatectomy.

- Dr. Paul DeRidder – Chief Medical Officer at Cold Genesys. Board-certified Urologist in private clinical practice for 22 years. Past Assistant Clinical Professor at UC Irvine Medical School. Past Chair of Urology at St. Joseph Hospital in Orange, CA and co-founder and Board member of Urotherapies, Inc.

- Dr. Andrew Perry – Founder and CEO of Perry Scientific (now Absorption Systems) is an in-vivo toxicology and pharmacokinetics testing company in San Diego, CA. Dr. Perry is an expert in the field of In-Vitro Diagnostics.