SMALL BUSINESS INNOVATION RESEARCH

Proposed FY2020 Contract Topics

NCI Board of Scientific Advisors Meeting
March 25, 2019

Andrew J. Kurtz, PhD
SBIR & STTR: Congressional Set-Asides

SBIR: Small Business Innovation Research (3.2%)

STTR: Small Business Technology Transfer (0.45%)

$167M (FY2018)

SBIR Contract Topics
- R&D scope defined by the NCI
- New topics once per year
- NIH-wide RFP

Investigator Initiated SBIR/STTR Grants 89%

Contracts 11%
Contract Topic Selection Process

21 Concept Ideas

- NCI Technology Priorities
- Commercial Potential
- Portfolio Gaps
- Cancer Moonshot

Technology Advisory Groups

1. Therapeutics, Clinical Diagnostics, and Molecular Analysis Techniques
2. Radiation Therapy, Medical Devices, and Information Technology

<table>
<thead>
<tr>
<th>Therapeutics</th>
<th>Clinical Diagnostics &amp; Molecular Analysis</th>
<th>Information Technology &amp; Bioinformatics</th>
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<tr>
<td>16</td>
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</table>
### Manufacturing Innovation for the Production of Cell-Based Cancer Immunotherapies

- **Goal:** Technologies that improve, modernize, and accelerate commercial-scale manufacturing for cell-based immunotherapy products

- **NCI Division(s):** Div. Cancer Treatment and Diagnosis, SBIR Development Center

### Development of Senolytic Agents for Cancer Treatment

- **Goal:** Preclinical development of novel anti-cancer agents that selectively target senescent cells

- **NCI Division(s):** Div. Cancer Treatment and Diagnosis, SBIR Development Center
| **8** Combinatory Treatment Modalities Utilizing Radiation to Locally Activate or Release Systemically Delivered Therapeutics | **Goal:** Preclinical development of novel agents that can be activated upon treatment with ionizing radiation |
| Div. Cancer Treatment and Diagnosis | SBIR Development Center |

<p>| <strong>9</strong> Sensing Tools to Measure Biological Response to Radiotherapy | <strong>Goal:</strong> <em>In vitro</em> or <em>in vivo</em> sensors that provide biological response information (complementary to physical radiation dose) |
| Div. Cancer Treatment and Diagnosis |</p>
<table>
<thead>
<tr>
<th>10</th>
<th>Quantitative Biomimetic Phantoms for Cancer Imaging</th>
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<tbody>
<tr>
<td></td>
<td><strong>Goal:</strong> Imaging phantoms made from materials that better represent the unique characteristics of organs commonly afflicted with cancers</td>
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<tr>
<th>11</th>
<th>Artificial Intelligence-Aided Imaging for Cancer Prevention, Diagnosis, and Monitoring</th>
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<tbody>
<tr>
<td></td>
<td><strong>Goal:</strong> Image analysis software aided by artificial intelligence to assist physicians with clinical decision making</td>
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</table>
| 12 Spatial Sequencing Technologies with Single Cell Resolution for Cancer Research and Precision Medicine | Goal: Technologies that generate sequence information from tissue slides without losing the histological context of the gene targets  
*[Rec J] Development of new enabling cancer technologies; characterization of DNA and RNA from individual cells |
| --- | --- |
| **Div. Cancer Treatment and Diagnosis**  
**SBIR Development Center** |  |

| 13 Subcellular Microscopy and ‘Omics in Cancer Cell Biology | Goal: Technologies that provide spatially-resolved, molecular phenotypic information  
*[Rec J] Development of new enabling cancer technologies; multidimensional single-cell imaging |
| --- | --- |
| **Div. Cancer Biology**  
**SBIR Development Center** |  |
### 14 Intra-Tumor Sensing Technologies for Tumor Pharmacotyping

| Center for Strategic Scientific Initiatives |
| Div. Cancer Treatment and Diagnosis |
| SBIR Development Center |

**Goal:** Sensing approaches that provide *in vivo* readouts on the efficacy of candidate therapeutic agents

*Rec J* Development of new enabling cancer technologies; emergent technologies for tumor pharmacotyping
### 15 IT Tools to Improve Patient Navigation Through the Cancer Care Continuum

- Div. Cancer Control and Population Sciences

**Goal:** Tools that assist decision-making and reduce the burden of tasks completed by patients and patient navigators

* [Rec F] Symptom management research  
* [Rec G] Prevention and early detection  
* Cross-cutting theme to address health disparities

### 16 Cloud-Based IT Tools for Big Data Analysis in the Cancer Research Data Commons

- Center for Biomedical Informatics and Information Technology

**Goal:** New or existing analytic tools that provide secure access to the various big data types within the Data Commons

* [Rec D] Developing a national cancer data ecosystem
<table>
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<tr>
<th>17 Tools and Technologies for Visualizing Multi-Scale Data</th>
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<tr>
<td>Center for Strategic Scientific Initiatives</td>
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<td>Div. Cancer Biology</td>
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<tr>
<td>SBIR Development Center</td>
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**Goal:** Tools that enable integration, visualization, and analysis of data generated using different analytical approaches

*Generation of human tumor atlases*

<table>
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<tr>
<th>18 IT Tools for Automated Analysis of Physical Activity, Performance, and Behavior from Images for Improved Cancer Health</th>
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<tr>
<td>Div. Cancer Control and Population Sciences</td>
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**Goal:** Software that can automatically extract physical activity data from patient images for clinical and home monitoring
<table>
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<tr>
<th>19</th>
<th>Cancer Clinical Trials Recruitment and Retention Tools for Participant Engagement</th>
</tr>
</thead>
</table>
|     | *Div. Cancer Prevention*  
|     | *SBIR Development Center*  |
| **Goal:** | Tools for clinicians and participants that address barriers to participation, simplify recruitment, and increase retention  |
|     | *[Rec A] Establishing a network for direct patient engagement*  |

<table>
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<tr>
<th>20</th>
<th>De-Identification Software Tools for Cancer Imaging Research</th>
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<tr>
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<td><em>Center for Biomedical Informatics and Information Technology</em></td>
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<tr>
<td><strong>Goal:</strong></td>
<td>Tools that automate the removal of Protected Health Information (PHI) from image data files to facilitate data sharing</td>
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<tr>
<td><strong>21</strong> Software Enabling Data Integration from Wearable Sensors to Generate Novel Analytics for Cancer Patients</td>
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<tr>
<td>▪ <em>Div. Cancer Treatment and Diagnosis</em></td>
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<td>▪ <em>Div. Cancer Control and Population Sciences</em></td>
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**Goal:** Software that can integrate objective data from wearable sensors to support clinical cancer research

*[Rec F] Symptom management research*
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Case: MagArray, Inc.

Early Diagnostics Using Nanotechnology-Based Imaging and Sensing (2007)

**Goal**
- To develop sensors with improved sensitivity and specificity of genomic and proteomic signatures for early detection and post-treatment monitoring

- **Phase I contract (2007-2008)**
- **Phase II contract (2009-2011)**
- **Phase IIB Bridge grant (2013-2017)**

- **Stanford spin-out**
- **Ultrasensitive multiplex immunoassay systems**
- **REVEAL Blood Test for Lung Nodule Characterization (2018)**
Economic Impact – Study Goals

1. Quantify the contribution of the NCI SBIR/STTR program to the U.S. economy

2. Determine key patient and societal impacts resulting from technologies funded by the NCI SBIR/STTR program

Test Cohort
- 690 Phase II SBIR/STTR grant awards
- Awards made between 1998 – 2010
- 444 Companies
- $787 Million

Study timeline: September 2017 – September 2018
Economic Impact

$9.1 BILLION
in total sales to date of products and services resulting from the NCI SBIR/STTR Phase II grants

$26.1 BILLION
in total economic output nationwide

368 awards with sales, royalties, and follow-on R&D funding

$2.9 BILLION
in new tax revenues (federal, state, and local)

$8.1 BILLION
in labor income

107,918 estimated new jobs in the U.S.

sbir.cancer.gov/impact
Small Business/Academic Collaborations

FY2017 NCI SBIR/STTR

Total Award Budget

SBIR

STTR

Academic Institutions

Small Businesses

17% 44%