The UT Research & Creative Enterprise: Looking to 2020 and Beyond

Dr. Taylor Eighmy
Vice Chancellor for Research & Engagement
University of Tennessee, Knoxville

August 29, 2013
Academic Leadership Retreat
What is a Great Public Research University?

"But what has made our universities the greatest in the world is not the quality of our undergraduate education--- as important as that is---but our ability to fulfill one of the other central missions of the leading universities: the production of new knowledge through the discoveries that change our lives and the world."

Bull. Amer. Acad.
Reinvention/Repurposing is Underway:

- Association of American Universities (AAU)
- Association of Public And Land Grant Universities (APLU)
- National Research Council (NRC) of the National Academies,
- National Science Board (NSB) of the NSF
- WH Working Groups
UTK Top 25 Strategic Plan:
Peers...

### Top 25 Benchmark Schools

<table>
<thead>
<tr>
<th>Rank</th>
<th>School Name</th>
<th>AAU</th>
<th>Land Grant</th>
<th>Medical School</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>University of California – Berkeley</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2.</td>
<td>University of California – Los Angeles</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>3.</td>
<td>University of Virginia</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>4.</td>
<td>University of Michigan – Ann Arbor</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>5.</td>
<td>University of North Carolina – Chapel Hill</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>6.</td>
<td>University of Illinois – Urbana-Champaign</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>7.</td>
<td>University of Wisconsin – Madison</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>11.</td>
<td>University of California – Davis</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>11.</td>
<td>University of California – Santa Barbara</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>11.</td>
<td>University of Washington – Seattle</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>15.</td>
<td>Pennsylvania State University</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>15.</td>
<td>University of Florida</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>15.</td>
<td>University of Texas – Austin</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>18.</td>
<td>The Ohio State University</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>18.</td>
<td>University of Maryland – College Park</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>20.</td>
<td>University of Pittsburgh</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

#### Aspiration Group

<table>
<thead>
<tr>
<th>Rank</th>
<th>School Name</th>
<th>AAU</th>
<th>Land Grant</th>
<th>Medical School</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td>University of Georgia</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>22.</td>
<td>Clemson University</td>
<td>Y</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>22.</td>
<td>Purdue University</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>22.</td>
<td>Texas A&amp;M – College Station</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>22.</td>
<td>University of Minnesota</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>26.</td>
<td>Rutgers, The State University of New Jersey</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>29.</td>
<td>Indiana University</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>29.</td>
<td>Michigan State University</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

#### Top 25 Target Group

<table>
<thead>
<tr>
<th>Rank</th>
<th>School Name</th>
<th>AAU</th>
<th>Land Grant</th>
<th>Medical School</th>
</tr>
</thead>
<tbody>
<tr>
<td>39.</td>
<td>Auburn University</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>39.</td>
<td>Iowa State University</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>39.</td>
<td>North Carolina State University – Raleigh</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

#### Current Peer Group
# Benchmark Institutions:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U. Georgia</td>
<td>Y</td>
<td>21</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>Y (new)</td>
<td>Y</td>
<td>N</td>
<td>College</td>
</tr>
<tr>
<td>Purdue U. WL</td>
<td>Y</td>
<td>22</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y (very large)</td>
<td>N</td>
<td>N</td>
<td>Dept.</td>
</tr>
<tr>
<td>TAMU</td>
<td>Y</td>
<td>23</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y (very large)</td>
<td>N</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Clemson U.</td>
<td>Y</td>
<td>24</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Dept.</td>
</tr>
<tr>
<td>Rutgers U. NB</td>
<td>Y</td>
<td>25</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>School*</td>
</tr>
<tr>
<td>Indiana U. Bloomington</td>
<td>Y</td>
<td>33</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>School</td>
</tr>
<tr>
<td>Stony Brook U.</td>
<td>N</td>
<td>36</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Program</td>
</tr>
<tr>
<td>UT, Knoxville</td>
<td>-</td>
<td>47</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Dept.</td>
</tr>
</tbody>
</table>

*Top 25 Public*
Current Top 25 Research-Related Metrics and Goals (primary):

<table>
<thead>
<tr>
<th>Existing Area Of Focus</th>
<th>Existing Primary Metric</th>
<th>Original Goal 2010</th>
<th>Expected 2013</th>
<th>Original Goal 2015</th>
<th>Original Goal 2020</th>
<th>Original Goal for &gt;2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>Federal Research Expenditures, $M</td>
<td>70</td>
<td>117</td>
<td>105</td>
<td>182</td>
<td>250</td>
</tr>
<tr>
<td>Research</td>
<td>Total Research Expenditures, $M</td>
<td>165</td>
<td>208</td>
<td>247</td>
<td>427</td>
<td>450</td>
</tr>
</tbody>
</table>
Snapshot, All Sponsored Activity, FY12 and FY13:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>FY12</th>
<th>FY13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of all proposals submitted</td>
<td>1,550</td>
<td>1,532</td>
</tr>
<tr>
<td>Total value of all proposals submitted</td>
<td>$459M</td>
<td>$508M</td>
</tr>
<tr>
<td>Total number of all awards received</td>
<td>1,349</td>
<td>1,259</td>
</tr>
<tr>
<td>Total value of all awards received</td>
<td>$167M</td>
<td>$162M</td>
</tr>
</tbody>
</table>
Snapshot, Federal Sponsored Activity, FY12 and FY13:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>FY12</th>
<th>FY13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of federal proposals submitted</td>
<td>994</td>
<td>935</td>
</tr>
<tr>
<td>Total value of federal proposals submitted</td>
<td>$435M</td>
<td>$401M</td>
</tr>
<tr>
<td>Total number of federal awards received</td>
<td>896</td>
<td>880</td>
</tr>
<tr>
<td>Total value of federal awards received</td>
<td>$109M</td>
<td>$106M</td>
</tr>
</tbody>
</table>
# Total Research Expenditures:

<table>
<thead>
<tr>
<th>Institution</th>
<th>FY12 TRE as Reported in 2013 NSFHERD, $M</th>
<th>National Rank Among USNWR Publics</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAMU</td>
<td>705.7</td>
<td>14</td>
</tr>
<tr>
<td>Purdue U. WL</td>
<td>578.2</td>
<td>18</td>
</tr>
<tr>
<td>Rutgers U. NB</td>
<td>432.3</td>
<td>26</td>
</tr>
<tr>
<td>U. Georgia</td>
<td>245.1</td>
<td>45</td>
</tr>
<tr>
<td>Stony Brook U.</td>
<td>211.3</td>
<td>53</td>
</tr>
<tr>
<td>Indiana U. Bloomington</td>
<td>184.0</td>
<td>58</td>
</tr>
<tr>
<td>UT, Knoxville</td>
<td>167.4</td>
<td>61</td>
</tr>
<tr>
<td>Clemson U.</td>
<td>166.3</td>
<td>62</td>
</tr>
</tbody>
</table>
Federal Research Expenditures:

<table>
<thead>
<tr>
<th>Institution</th>
<th>FY12 FRE as Reported in 2013 NSFHERD, $M</th>
<th>National Rank Among USNWR Publics</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAMU</td>
<td>291.8</td>
<td>21</td>
</tr>
<tr>
<td>Purdue U. WL</td>
<td>259.9</td>
<td>25</td>
</tr>
<tr>
<td>Rutgers U. NB</td>
<td>239.9</td>
<td>29</td>
</tr>
<tr>
<td>U. Georgia</td>
<td>137.3</td>
<td>45</td>
</tr>
<tr>
<td>Stony Brook U.</td>
<td>125.1</td>
<td>49</td>
</tr>
<tr>
<td>UT, Knoxville</td>
<td><strong>111.9</strong></td>
<td><strong>54</strong></td>
</tr>
<tr>
<td>Indiana U. Bloomington</td>
<td>74.1</td>
<td>65</td>
</tr>
<tr>
<td>Clemson U.</td>
<td>52.9</td>
<td>71</td>
</tr>
</tbody>
</table>
NSF Research Expenditures:

<table>
<thead>
<tr>
<th>Institution</th>
<th>FY12 NSF Expenditures as Reported in 2013 NSFHERD, $M</th>
<th>National Rank Among USNWR Publics</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAMU</td>
<td>107.0</td>
<td>3</td>
</tr>
<tr>
<td>Purdue</td>
<td>87.0</td>
<td>7</td>
</tr>
<tr>
<td>Rutgers U.</td>
<td>49.8</td>
<td>21</td>
</tr>
<tr>
<td>UT, Knoxville</td>
<td>37.1</td>
<td>29</td>
</tr>
<tr>
<td>Indiana U. Bloomington</td>
<td>26.2</td>
<td>38</td>
</tr>
<tr>
<td>U. Georgia</td>
<td>25.3</td>
<td>39</td>
</tr>
<tr>
<td>Stony Brook U.</td>
<td>18.9</td>
<td>50</td>
</tr>
<tr>
<td>Clemson</td>
<td>10.5</td>
<td>60</td>
</tr>
</tbody>
</table>
DOE Research Expenditures:

<table>
<thead>
<tr>
<th>Institution</th>
<th>FY12 DOE Expenditures as Reported in 2013 NSFHERD, $M</th>
<th>National Rank Among USNWR Publics</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT, Knoxville</td>
<td>32.4</td>
<td>6</td>
</tr>
<tr>
<td>TAMU</td>
<td>28.4</td>
<td>8</td>
</tr>
<tr>
<td>Purdue U. WL</td>
<td>27.4</td>
<td>9</td>
</tr>
<tr>
<td>U. Georgia</td>
<td>14.8</td>
<td>22</td>
</tr>
<tr>
<td>Stony Brook U.</td>
<td>12.8</td>
<td>27</td>
</tr>
<tr>
<td>Rutgers U. NB</td>
<td>9.1</td>
<td>40</td>
</tr>
<tr>
<td>Indiana U. Bloomington</td>
<td>4.6</td>
<td>60</td>
</tr>
<tr>
<td>Clemson U.</td>
<td>3.5</td>
<td>66</td>
</tr>
</tbody>
</table>
## DOD Research Expenditures:

<table>
<thead>
<tr>
<th>Institution</th>
<th>FY12 DOD Expenditures as Reported in 2013 NSFHERD, $M</th>
<th>National Rank Among USNWR Publics</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAMU</td>
<td>36.1</td>
<td>13</td>
</tr>
<tr>
<td>Purdue U. WL</td>
<td>32.6</td>
<td>17</td>
</tr>
<tr>
<td>Rutgers U. NB</td>
<td>26.0</td>
<td>21</td>
</tr>
<tr>
<td>UT, Knoxville</td>
<td>17.6</td>
<td>35</td>
</tr>
<tr>
<td>Stony Brook U.</td>
<td>8.2</td>
<td>58</td>
</tr>
<tr>
<td>Indiana U. Bloomington</td>
<td>5.2</td>
<td>66</td>
</tr>
<tr>
<td>U. Georgia</td>
<td>2.9</td>
<td>71</td>
</tr>
<tr>
<td>Clemson U.</td>
<td>2.1</td>
<td>73</td>
</tr>
</tbody>
</table>
Our Excellence in Scholarship:

- SciVal analyses on publications over last five years
- (ca. 11M publications in Scopus, 11.5k from UT Knoxville)
- 104 emerging competencies
- 14 distinct competencies, e.g.
  - Materials science, superconductors, surface science
  - Nuclear physics
  - Data mining
  - Signal processing, wireless, control theory
  - Computational chemistry
  - Molecular ecology
  - Macromolecules & polymers
DC1: Materials Science, Superconductor Science, Defects & Diffusion, Surface Science:
SciVal Competencies (2012):

<table>
<thead>
<tr>
<th>Institution</th>
<th>Distinctive</th>
<th>Emerging</th>
</tr>
</thead>
<tbody>
<tr>
<td>U. Georgia</td>
<td>33</td>
<td>215</td>
</tr>
<tr>
<td>TAMU</td>
<td>25</td>
<td>207</td>
</tr>
<tr>
<td>Indiana U. Bloomington</td>
<td>20</td>
<td>163</td>
</tr>
<tr>
<td>Clemson</td>
<td>16</td>
<td>82</td>
</tr>
<tr>
<td>Purdue U. WL</td>
<td>15</td>
<td>164</td>
</tr>
<tr>
<td>UT, Knoxville</td>
<td>14</td>
<td>104</td>
</tr>
<tr>
<td>Rutgers U. NB</td>
<td>12</td>
<td>151</td>
</tr>
<tr>
<td>Stony Brook U.</td>
<td>12</td>
<td>104</td>
</tr>
</tbody>
</table>
Some AY13 Faculty Annual Awards:

Carol Tenopir, AAAS Fellow
Pencheng Dai, AAAS Fellow
Howard Hall, AAAS Fellow
Jimmy Mays, AAAS Fellow
Gary Sayler, AAAS Fellow
Alexi Sokolov, AAAS Fellow
Jan Simek, AAAS Fellow

Jason Hayward, DOE Early Career
David Jenkins, NSF CAREER
Jan Mannik, NSF CAREER
Jeff Reinbolt, NSF CAREER
Eric Lukosi, ORAU Powe Award
Some AY 2013 Faculty Annual Awards:

- Tom Burman, NEH Fellow
- Aleydis Van de Moortel, American School for Classical Studies in Athens
- Aleydis Van de Moortel, Fulbright Fellow
- Shellen Wu, Henry Luce Foundation/ACLS in China Fellow
- Shellen Wu, ACLS American Research in Humanities in China Fellow
- Mary Campbell, ACLS Fellow
- Julie Reed, Clements Center for Southwest Studies at SMU
- Laura Nenzi, Institute for Advanced Studies Fellowship
- Melanie Eldridge, Fulbright Fellow
- Scott Frey, Fulbright Fellow
- Rebecca Klenk, Fulbright Fellow
- Wanda Costen, Fulbright Fellow
Celebration of Excellence:

NIMBioS Wins $18 Million Renewal Award from National Science Foundation

Posted on July 22, 2013 8:52 am • Categorized as Headlines, Research

The National Science Foundation (NSF) has awarded $18.6 million to UT for the National Institute for Mathematical and Biological Synthesis (NIMBioS) to continue its interdisciplinary efforts in developing new mathematical approaches to problems across biology, from the level of the genome to individuals to entire ecosystems.

The award covers the next five years and renews the work of the institute, which was initially funded by a five-year $16 million NSF award in 2008. NIMBioS is also supported by UT.

Chancellor Jimmy G. Cheek said NIMBioS’ track record for success has raised UT’s profile for cross-disciplinary science.
Celebration of Excellence:

- http://bridgeclubtrailer.com
- http://thebridgeclub.net
- http://art.utk.edu/4d/faculty/
- faculty.html

- 2013 New Media Festival in Copenhagen, Denmark
- 2013 Texas Biennial
- Santa Fe International Media Festival
- IDEA Fund Grant
- Artistic Innovations Grant from M-AAA (and NEH)

Emily Bivens
Our Evolving Federal Funding Focus:

**Some Ongoing:**
- Materials Science
- Computational Science
- Biological Informatics
- Modeling & Simulation
- Nuclear Engineering
- Soft Materials
- Hard Materials
- Energy Storage
- Microbial Ecosystem Informatics
- Water/Agriculture/Climate

**Some Trending:**
- Cybersecurity
- Advanced Manufacturing
- Big Data/Informatics
- Health Informatics
- Cognitive Computing
- Neutron Science & Biology
- Neuroimaging
ORE Reorganization:

AVCR (Reed)
- Communications
- Core Facilities (new)
- Sponsored Programs
- Research Informatics
- Faculty Development Team

VCRE (Eighmy)
- Finance & Administration
- Centers & Institutes
- Engagement & Outreach
- Research Development Team
- Undergraduate Research

AVCR for RCR (new)
- RCR (new)
- FCOI
- Human Subjects
- Animal Use & Care
- Biosafety
- Radiation Safety

Within OR

Research Council (staffed by Jane Taylor)
Associate Deans for Research
Graduate Council

External to OR

Top 25 REAC
Academic Outreach & Engagement Council (staffed by Jerri DAoust)
Strategic Advisory Council (new)

IACUC
Lab Safety
FCOI (new)
IRB
Compliance
ORE Listening Sessions:

- Three listening sessions last fall/winter (invited/attended):
  - October, ’12 (121/84)
  - December, ’12 (144/67)
  - January, ’13 (225/45)
- About 700 recommendations made
- Prioritized by attendees
- Nine focus areas:
  - Funding & Facilities
  - Communications
  - Human Resources
  - Professional Development
  - Compliance
  - Proposal Development
  - Collaborations & Partnerships
  - Graduate School
  - Other
- Assigning responsibility, time frame, and status
- Roll out ORE Action Plan this fall, evaluate annually
Top 25 Strategic Plan for Research REAC:

- Add to the prior excellent work
- Further reshape to focus on TREs and FREs
- Expand advocacy and and champions
- Evolved into over 60 action items/targets spread across:
  - Increasing TRE
  - Increasing FRE
  - Engaged Outreach
  - Faculty Support
  - Student Support
  - Research Infrastructure Support

- Further sharing and roll out required
Top 25 REAC Members:

- Susan Ballentine (ORE)
- Chris Boake (ADR CAS)
- Alexandra Brewer (GSS/GSA)
- Bill Brown (UTIA)
- Chris Cimino (VCFA)
- George Dodds (COA)
- Bill Dunne (ADR COE)
- Nicole Fazio-Veigel (ONSF)
- Marc Gibson (UT Development)
- Lee Han (Past RC Chair)
- Carolyn Hodges (Grad School)
- Dave Irvine (AVRFA)
- Tom King (CURENT/ORNL)
- Tony Mezzacappa (JICS)
- Paul Montgomery (ORE)
- Sally Morris (UT Development)
- Margie Nichols (VCC)
- Stacey Patterson (UTS AVPR)
- Rebecca Prosser (Psychology)
- Greg Reed (ORE)
- Joel Reeves (AVCR IT)
- Sahba Seddighi (USRA)
- Charlie Senn (ORE)
- Tina Shepardson (RC Chair)
- Melissa Shivers (Chancellor’s Office)
- Carol Tenopir (CMC)
- Dave Washburn (UTRF)
- John Zomchick (Provost’s Office)
Community Engagement:

- Carnegie Foundation proposal
- Two way partnerships:
  - Communities
  - Industry
  - Government
  - NGOs
- Experiential learning
  - Service learning
  - Study abroad
  - Undergraduate research
  - Leadership

Dr. Tim Cross, UTIA
Elizabeth Burman, UT, Knoxville
Research Development Team:

- Large federal proposals
- Diversity opportunities with GS and VCD
- Early knowledge
- Early support for internal champions
- Early teaming with external partners
- NORDP
- Support across the project life continuum
- Since January, 2013:
  - $73M submitted, pending notification
  - $80M under development
  - $32M submitted, but denied
Research Development Team:
Faculty Development Team:

- Individual PI support
- College coordination
- Communities of scholars
- Transdisciplinary research
- Faculty annual awards
- CAREER Awards
- Sigma Xi
- Coordination with UTIA & UTHSC
- Coordination with UT Medical Center & GSM

Director
Bill Stanley
Jim Lloyd
Alan Rutenberg
Diana Moyer
Corporate & Foundations Relations Group:

- Top 100 corporate targets
- Top 25 foundation targets
- Senior executive connectivity with UT connection
- Long term relationship building
- Multi-component relationships
- R&D and fellowships
Ongoing Corporate R&D Engagement:
Ongoing Foundation Engagement:
Undergraduate Research@UT:

- > 400 active faculty mentors
- > 400 undergraduates in the Undergraduate Student Research Association (USRA)
- 138 faculty mentors in EUReCA April ’13 showcase
- 338 students in EureCA April ‘13 showcase
- 242 posters in April ‘13 showcase
- 64 presentations at USRA research conference in April ’13
- About 60 summer fellowships for students and faculty mentors
Innovation Ecosystem:
Innovation Ecosystem:

- Federal imperative
- State focus
- Important component of our Top 25 plan
- Closely tied to our corporate engagement strategy
- Cultural challenges that are being overcome...
- Identify and clarify value proposition for a faculty member... how to tie to expanded notion of scholarship and engagement where appropriate?
- Celebrate progress
- Pilot program with COE and CAS
Questions?

Please feel free to contact me:

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(806)252-6444 (cell)

Text or call

This presentation can be found here:

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