Minnesota State University, Mankato
Strategic Initiative Funding
Step 2: Invited Full Proposal

Proposal Name: Next Generation Anatomy: Acquisition of an Anatomage Table

Total Strategic Initiative Funding Requested for Expenditure in FY17 (2016-2017) $ 70,250 (total proposal all sources $79,026)

Does the proposed project address one of the high priority funding areas? If yes, check all that apply.
   X Academic Master Plan
      Global Solutions - Change the world by collaboratively addressing our planet's most challenging problems.
      X Campus of the Future - Reinvigorate our physical home and build the campus of the future.
      Quality and Excellence - Measure and continuously improve our work to ensure excellence in all that we do.

Does the proposed project address any of the following 2010-2015 Strategic Priorities? If yes, check all that apply.
   X Extended Learning - Greatly expand the reach of our extended learning programs.
   Applied Doctoral Institution - Foster the thriving and robust academic culture of a university with applied doctoral programs.

Do the proposed project outcomes address any of the following Institutional Priority Measures? If yes, check all that apply:
   X Student Persistence and Completion
      Student Persistence and Completion for Students of Color
      Student Degree Completion
      Student Degree Completion for Students of Color
   X Licensure Exam Pass Rates
   X Customized Training & Continuing Education Enrollment

Have you previously received Strategic Initiative Funding to support a project? No

Has any portion of this project been previously supported by Strategic Initiative Funds? No

Will any portion of this project require funding after the conclusion of Strategic Initiative Funds (June 30, 2017) to be sustained? X Optional Yes No If yes, please explain. Optional extended warranty and software updates totaling $7000 annually however the Deans of CSET and CAHN (see below) have agreed to split this cost.

Are funds from any other sources needed to initiate and complete the project as proposed? (Check all that apply) YES - $8,776
   • Institutional Equipment $________________
   • Repair and Replacement (R&R) $______________
   • Departmental Funds $________________
   • College or Divisional Funds $7,000 ($3500 CSET + $3500 CAHN)___________
   • External/Grant Funds $________________
   • Other: Discount towards leveraged equipment $1,776___________
   • Other: ____________________________ $______________
Proposal Contact Information and Review Signatures:

Primary Contact Name: David Sharlin  
Campus Mailing Address: TS242

Primary Email Address: david.sharlin@mnss.edu  
Phone Number: 1085

Please note:

- Upon notification of funding, the primary contact recipient will work with the Assessment and Evaluation Sub-Meet to prepare an assessment plan. Funds will only be released upon completion and approval of the assessment plan.
- A Mid-Year Report will be due January 15, 2017, and an Annual Report will be due June 30, 2017.

Primary Contact Signature:  
Date: 1/27/2016

*Signatures are needed for all affected units, departments and colleges (remember to include units such as Extended Education, Graduate Studies, Institutional Research, Information Technology, etc.). Attach additional cover/signature sheets as needed.

*Co-Applicant Name(s) and Signature(s):

Michael Bentley  
Name: Michael Bentley  
Signature:  
Date: 1/27/16

Patrick Sexton  
Name: Patrick Sexton  
Signature:  
Date: 1/27/16

Name  
Signature  
Date

Name  
Signature  
Date

Name  
Signature  
Date

Name  
Signature  
Date

*I have reviewed and support the following proposal:

Penny Knochel  
Department Director/Chair Name  
Signature  
Date: 1/27/16

Lynnette Engard  
Department Director/Chair Name  
Signature  
Date: 1/28/16

Department Director/Chair Name  
Signature  
Date

Department Director/Chair Name  
Signature  
Date

Department Director/Chair Name  
Signature  
Date

Department Director/Chair Name  
Signature  
Date

Department Director/Chair Name  
Signature  
Date

Department Director/Chair Name  
Signature  
Date
*I have **reviewed** and **approve** the following proposal:

Dean Signature* ___________________________ Date ____________

Do you have any reservations or concerns about the project being proposed?

Dean Signature* ___________________________ Date ____________

No.

Dean Signature* ___________________________ Date ____________

No.

Dean Signature* ___________________________ Date ____________

Dean Signature* ___________________________ Date ____________

RECEIVED

FEB 01 2016

Office of the Provost
Minnesota State University, Mankato

Date Received by Institutional Research, Planning, and Assessment: ____________________________

(Deadline is February 1, 2016)

*Signatures are needed for all affected units, departments and colleges (remember to include units such as Extended Education, Graduate Studies, Institutional Research, Information Technology, etc.). Attach additional cover/signature sheets as needed.
Proposal Name: **Next Generation Anatomy: Acquisition of an Anatomage Table**

(Increase space between questions or add pages as needed)

1. **Provide a clear description of the project being proposed. (5 points)**

   **Overview.**

   This proposal seeks to acquire an Anatomage Table – the most technologically advanced anatomy visualization system for education. It is an all-in-one, touch-interactive display system that provides true anatomy, in life-size scale, from imaged cadavers to generate dissectible high-resolution 3D gross male and female body plans (Figure 1). The comprehensive body plans showcase real tissue color and anatomical structures directly from real cadavers in digital form. The table resembles an operating table or hospital bed and digitally illustrates anatomical realism with the unique ability to layer/inspect individual systems (e.g., nervous, circulatory, and musculoskeletal systems) allowing students to fully examine specific structures.

   The table’s combination of hardware and software also provides a library with 120 pathological examples that translate to radiological/surgery case review, patient consultation, research purposes, and education.

   This advanced teaching tool will impact a very large number of undergraduate and graduate students. Over 1000 students register each year in Human Anatomy (Biol 220) making it one of the largest courses on campus. Additionally, 200-300 undergraduate and 60 graduate students in Health and Human Performance take upper level and graduate courses that require advanced anatomy models. Furthermore, multiple programs within CAHN (athletic training, dental hygiene, exercise science, nursing, and communication disorders) will use this powerful tool. Therefore, the interdepartmental and intercollegial impact is tremendous.

   **Students want cadavers.**

   Student responses to class climate surveys and lab specific surveys conducted in Biol 220 (Human Anatomy) routinely indicate that student have a desire to work with cadavers. Students suggest “adding cadavers” when asked “What do you suggest to improve this course?”. Also, in Spring 2015, in a D2L survey, students overwhelmingly indicated that digital dissection; on a life size cadaver would be of interest with 90% responding yes (Figure 2).

   ![Figure 1. Students and faculty working with an Anatomage table. This image is meant to provide a visual of the life-like size of the table.](image)

   **Table:**

   | Question 3 | Yes | 149 (90.3 %) | No | 16 (9.7 %) |

   *Figure 2. Student response to a survey conducted in Biol220, Human Anatomy, asking whether digital dissection on a life-size digital cadaver would be of interest. Survey was conducted Spring 2015, prior to 2015-16 SPF request for proposals.*
Classroom and Laboratory Integration.

The Anatomage will be used for lecture-type instruction in addition to student directed dissection during lab times. The Anatomage is capable of connecting to projectors and content can be preset and preloaded. As instructors, we will have the ability to create and demonstrate technical material, making lectures more dynamic and engaging. In addition, the Anatomage hardware allows for screen captures and recording of short video clips, which can then be shared with students as review material. Thus, integrating the Anatomage table into lecture and laboratory exercises transforms traditional anatomy courses – that are often difficult and dry – into an active and enriching environment. We see it as powerful supplemental tool for advancing anatomy education.

Furthermore, the Anatomage contains a RJ45 network connection (Ethernet), which will provide streaming capabilities and allow, as needed, for distance learning. This capability will immediately impact online courses such as HP 606 Anatomic Basis of Musculoskeletal Injury for the graduate athletic training students.

Why the Anatomage and not cadavers?

Due to the large enrollment in Human Anatomy and Human Performance classes (>1300/yr), cadavers are logistically- and cost-prohibitive. Maintaining cadavers on campus requires special safety, ventilation, and housing systems that are prohibitive. Table 1 compares the Anatomage to a typical cadaver lab. The Anatomage will provide an opportunity for students to dissect a life-size digital cadaver, preparing them for advanced study.

| Table 1. A comparison of the Anatomage Table with a standard cadaver lab. |
|----------------------------------|-----------------|------------------|
| **Chemicals Involved** | None | Formaldehyde, phenol, ethylene glycol |
| **Safety Concerns** | None | Biohazard, chemical, razor, cadaver perception |
| **Facility Requirements** | No special requirements | Ventilation, lock-and-key storage, disposal |
| **Hands-on Dissection** | Feasible | Not Feasible, too many students |
| **Restrictions** | None | Local, state regulations |
| **Disease Examples** | Many | Cadaver dependent |
| **Recurring costs** | Minimal | Acquisition and maintenance. Faculty duty days annually for pro-section of new cadavers. |

Why models are not enough?

Models play an important part of the anatomy curriculum. However, many plastic models are overly simplified and have poor (and inaccurate) detail providing for an unrealistic experience. In addition, models provide little flexibility for plane and sectional viewing. The Anatomage will supplement our models providing an enhanced experience that will elevate the quality of instruction and improve student outcomes.

Sharing of Resources Across Colleges.

This proposal is a collaboration between the Department of Biological Sciences and Department of Human Performance/Athletic Training. The Anatomage table is mobile with wheels and can be easily moved between teaching labs if needed. However, receiving feedback from our initial proposal, we have decided make the Biol 220 Laboratory the home for the Anatomage Table and have students from HP and other programs use this lab on a as needed basis. In addition, we are discussing developing a shared, high tech, advance anatomy lab that would ultimately house Anatomage Table.

It should also be noted that the contained 3D files can exported for 3D printing, which may act as a catalyst for initiating collaborations between engineering and our departments. Furthermore, specialized models could be printed for laboratory instruction. Finally, the ability to 3D print anatomic models could off-set some of the costs or purchasing other anatomic models for use in lecture and labs.

Potential for Outreach.

CSET and CAHN are invested in a number STEM and health initiatives, respectively, including the Girls Explore STEM Camp, Latino Engineering and Academic Day (LEAD), and the African American
Engineering and Academic Day (A2EAD). The Anatomage could easily be integrated into these events facilitating recruitment of these underrepresented groups to a STEM or allied health discipline.


With an increase in the clinical sciences, comes a need for more advanced anatomy education. Through developing this proposal, we have begun discussing the need for an advanced anatomy clinical laboratory that will serve pre-professional and professional (athletic training and other clinical programs) students within CAHN. Installation of the Anatomage Table in our current curriculum will provide the opportunity to better plan for the future.

2. Describe how the University's Academic Master Plan or 2010-2015 Strategic Priorities would be advanced by this project. (10 points)

This proposal advances strategic actions of Promoting Global Solutions and Creating the Campus of the Future. It also aligns with Big Ideas within the Academic Master Plan.

1. Promote Global Solutions: The Anatomage will help prepare students to become innovative and confident leaders in their professions and differentiate our university from our competitors for students and for financial political support.

2. Creating the Campus of the Future: This strategic objective includes creating innovative and technologically advanced classrooms. The Anatomage is the technological future for anatomical studies in the classroom and online (streaming capable).

3. Academic Master Plan:

   • Advancing student enrollment and retention: The Anatomage will provide increased opportunities for student engagement. Furthermore, MSU Mankato would be the only MNSCU institution with this technology; thus it would serve as a recruitment tool.

   • Support proposed growth of academic programs: As allied health and clinical programs grow, the Anatomage will support these efforts.

   • Develop and grow continuing education: The new professional master's degree in athletic training comes online summer 2016 and will immediately use the Anatomage. Additionally, clinical programs in CSET and CAHN will use this technology. For example, the Department of Biological Sciences is currently discussing the development of a 300-400 level gross anatomy course to serve pre-professional students whose post-graduate programs are increasingly requiring an upper level anatomy course (which is currently not offered at MSUM).

3. Describe how the project will have a significant impact on students and deliver a significant return on investment to the University. If applicable, please indicate how the project will address our Institutional Priority Measures. (10 points)

The Anatomage will provide students a learning experience that is second to none impacting both classroom and laboratory learning. In doing so, it will provide:

i. Faculty the ability to describe, in 3D, complex anatomical structures. An ability that is superior of 2D imagery.

ii. A hands-on and engaging learning environment that will allow students an opportunity to digitally dissect and rotate complex anatomical structures in 3D.

iii. Instruction on a state-of-art teaching tool.

The return on investment will be realized in several domains.

i. Offer a learning environment that will help students succeed and reduce course repeats.

ii. MSU Mankato will be the only institution in the state with an Anatomage. Therefore, it can be used for recruiting and promotional material.

iii. Provide infrastructure that will likely be used by other programs as the technology becomes known within the university. Short videos can be recorded and streamed or placed in D2L Brightspace for use during face-to-face, online, and hybrid course instruction.

iv. Provide tool for outreach initiatives across campus (see above).
4. Identify the outcomes that will be used to measure the impact of the proposed project. Outcomes must be specific, measurable, achievable within the one-year of strategic priority funding, and relevant to the Academic Master Plan, 2010-2015 Strategic Priorities, and/or Institutional Priority Measures the project addresses. (10 points)

The specific deliverable and measurable outcomes include:

i. Acquisition and installation of the Anatomage.
ii. Observable reduction in the number of students who repeat anatomy.
iii. Number of courses that utilize the Anatomage.
iv. The number of students who go on to advanced study.
v. Student success on laboratory exams.
vi. Student satisfaction surveys and/or teaching evaluations addressing the incorporation/utilization of the Anatomage.

5) Describe how the activities generated by this project will be sustained after strategic priority funding has ended, or if applicable, explain why the project does not need to be sustained. (15 points)

Generally speaking, following purchase and installation of the Anatomage Table, no additional funds are needed. However, like all advanced equipment, future repairs and upgrades may be needed. If such repairs or updates are needed in the future, our Departments and Colleges allocate funds yearly for this type of need.

However, an optional extended warranty and software updates are available for purchase. This proposal does seek funds to purchase 1 extra year of warranty and software updates (1st year included) and our respective colleges have agreed to cover this cost (see budget).

6.a. Provide a budget justification that explains why the funding being requested is required to support the project and outline the funding requested within the budget table below. (15 points)

The total cost for the Anatomage Table and all ancillaries is $77,250 ($79,026 before discount). An official quote is included.

As a company that develops educational tools, Anatomage primarily works with public and private universities and does not usually offer education discounts. We explained MNSCU’s leverage equipment program and the Anatomage Company has agreed to waive, as a contribution to this program, the $1,766 shipping, crating and insurance fee.

Additionally, since our initial proposal, our respective Deans have agreed to contribute $7,000 ($3,500 each college) to cover annual cost of the extended warranty. We hoped that our colleges could contribute more, but CSET and CAHN both have high demands for technologically driven equipment and currently have lists of equipment needs exceeding 1 million dollars. Furthermore, many Biol 220’s anatomical models are over a decade old and with 1000 students a year handling models, they are in dire need of replacement at a cost of ~ $75,000. This is a top priority for our department and college. During AY14-15, the Department of Biological Sciences allocated $15,000 of summer proceeds and in AY15-16 CSET has allocated an additional $20,000 to begin replacing broken models. The CAHN has supported ($30-40,000) clinical anatomy needs for programs/students in allied health programs by supporting 25 licenses to Anatomy TV (an online anatomy teaching tool) for faculty and student use in their respective courses. Taken together, these investments from our college clearly demonstrate a continued support of anatomy education.

We acknowledge that the cost of the Anatomage Table is hefty, but this educational tool is one-of-kind and is the future of anatomy education. In this regard, several medical schools have adopted the Anatomage Table to facilitate anatomy education. We predict that over the course of 1 year, approximately 1,300 students across multiple departments and colleges will have exposure to the Anatomage Table. Thus, the University investment per student in the first year would be $60 and clearly drop with each year of use. This investment will put our students “ahead of the curve” with regard to anatomy education.

Equipment and Software - $70,000.

The base cost of the Anatomage Table is plus extended library are $70,000. The extended digital library provides over 600 additional skins which demonstrate pathology. The digital library greatly expands the
user experience by including additional scans. The base cost also includes – 1st year software upgrades, tech support, and hardware warranty, InVivo5 3D imaging Software with Medical Design Studio, and onsite installation and training.

**Additional Costs - $9,026.**

Shipping, crating, and insurance costs $1,776. However, to contribute the leveraged equipment program, Anatome has agreed to provide this as a discount. We also request $7,000 to purchase an additional 1-year extended warranty that includes software upgrades. This cost will be covered by the Deans of CSET and CAHN. Finally, we request $250 to purchase a protective table cover.

6.b. **Budget Table (10 points):**

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<thead>
<tr>
<th>Personnel</th>
<th>FY16 SPF Funds</th>
<th>FY16 Funds from all Other Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unclassified Salary (in-load, overload)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Classified Salary</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fringe&lt;sup&gt;a&lt;/sup&gt; (Classified and Unclassified)</td>
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<td>0</td>
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<tr>
<td>Graduate Assistant Salary</td>
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<td>0</td>
</tr>
<tr>
<td>Graduate Assistant Tuition Reduction/Waiver&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

| Non-Salary                                      |                |                                  |
| Student Help                                    | 0              | 0                                |
| Purchased Services/Travel Expenses              | 0              | 0                                |
| Supplies and Materials                          | 0              | 0                                |
| Building Improvement/Construction Costs         | 0              | 0                                |
| Equipment                                       | $70,000        | $1,776 (leverage discount)       |
| Other (please specify) –                        |                | $7,000 (College Deans)          |
| 1. Shipping, crating, Insurance                 |                |                                  |
| 2. 1 year extended warranty + update            | $250           |                                  |
| 3. Table protective cover                       |                |                                  |
| **Total Budget/Funding Requested**             | $70,250        | $8,776                           |

<sup>a</sup> Note: All current employees must be paid fringe benefits. Fringe should be estimated based on salary and position classification: Unclassified 32%, Classified 40%, Adjunct 7.65%.

<sup>b</sup> Estimated Tuition Reduction/Waiver for full-year enrollment: Masters $6,850, Doctoral $9,950.

7. **Identify any special considerations or needs required for this project and how the needs will be addressed (e.g. physical space, contractual obligations, release or reassigned time, sabbatical or other leaves, workload, IT support, or collaborations with/implications for other units). (10 points)**

**Physical Space:** The Anatome Table will be primarily housed in Trafton South 252, the Biology 220 Human Anatomy teaching laboratory. Space along the west wall, which is currently occupied by a movable table, will store the Anatome Table when not in use. After reviewing proposal feedback, we have decided that students in HP courses will come to the TS252 lab to use the table rather than wheeling it around campus. However, mobility of the table is plus, as it can be moved on needs basis.

**IT Support:** The nature of the Anatome Table will require some expert IT input to fully utilize its networking and streaming capabilities. We have discussed this technology with IT; who agreed to support this technology (please letter of support from Matthew Clay, Assistant CIO for Academic Technology and the Technology Directors, ITS).

8. **Provide a 1-year project timeline outlining key tasks and dates for completion. (10 points)**

**Pre-award Coordination.** Upon award, the proposal collaborators will meet to finalize logistics and scheduling needs for the semester. Meet with IT to make plans for installation. Develop project assessments.
August 2016. Order, install, and complete training. Begin developing course modules that include Anatomage education.

September 2016. Promote the Anatomage Table to colleagues and outreach initiatives.

September – November 2016. Coordinate public relations/marketing (photos, news release, etc) for the Anatomage table to immediately capitalize on the marketing aspect of the proposal for a return on investment for this purchase.

September 2016 - May 2017. Implement the Anatomage Table in to course curriculum.

December 2016 - January 2017. Assess usage and student feedback. Make adjustments to curriculum and logistics as needed.

June 2017. Assess usage and student feedback. Make adjustments to curriculum and logistics as needed. Provide assessments and draft final report.
Anatomage

PRICE QUOTE FOR ANATOMAGE TABLE

DATE: 01/27/2016
Prepared by: Jake Lehman
Jake.lehman@anatomage.com
(408) 885-1474 x114

<table>
<thead>
<tr>
<th>Institute Name</th>
<th>Minnesota State University Mankato</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>David Sharlin</td>
</tr>
<tr>
<td>Address</td>
<td>342 Trafton Science Center South</td>
</tr>
<tr>
<td></td>
<td>Mankato, MN 56001</td>
</tr>
<tr>
<td>Contact Number</td>
<td>507-389-1085</td>
</tr>
<tr>
<td>Email</td>
<td><a href="mailto:david.sharlin@mnsu.edu">david.sharlin@mnsu.edu</a></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit Price</th>
<th>Quantity</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>Anatomage Table + Digital Library</td>
<td>$70,000.00</td>
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<td>Anatomage Table Convertible + Digital Library</td>
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<td>$0</td>
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<tr>
<td>InVivo3D 3D imaging Software with Medical Design Studio</td>
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<tr>
<td>1st year Software Upgrade, Tech Support, and Warranty</td>
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<td>Included</td>
</tr>
<tr>
<td>1 Year of Additional Warranty, Software Upgrade, Tech Support</td>
<td>$7,000.00</td>
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<td>(2 years total with this option)</td>
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<td>(3 years total with this option)</td>
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<tr>
<td>4 Years of Additional Warranty, Software Upgrade, Tech Support</td>
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<tr>
<td>(5 years total with this option)</td>
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<tr>
<td>Table Cover (Optional, For Anatomage Table Only)</td>
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<td>$250.00</td>
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<tr>
<td>On-site Installation and Training</td>
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<td>Subtotal</td>
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</table>

Country of Origin: United States
Place of Manufacture: San Jose, CA
Quote must be paid in USD

Quote Valid until 5/31/2016

Acceptance

Signature ___________________________ Date ___________________________

CONFIDENTIAL
To Whom It May Concern:

In partnership with the College of Allied Health and Nursing and the College of Science, Engineering, and Technology, Information Technology Services (ITS) has committed to supporting a Strategic Priority Funding request last semester to acquire an Anatomage table (http://www.anatomage.com/medical-products/anatomage-table). The proposal was one of eight selected for full development. During the planning, ITS committed to support the integration into the classroom technology and will, if possible, provide limited support for the hardware, with the agreement and understanding, that we are not fiscally responsible for repairs or a high-level of support, as it is not a standard piece of equipment.

ITS

[Signature] 2/1/16