

**UTHSCSA Innovative Teaching Grants Program**  
*ITG Application*

**Title of ITG proposal:** Dynamic Visual Simulation of the Supraclavicular Nerve Block

**Names and titles of project director and principle collaborators:**

**Project Director:**

**Name:** D. Martin Bitner, M.D., M.S.

**Title:** Assistant Professor

**Department & Division:** Anesthesiology

**E-Mail:** bitner@uthscsa.edu

**Campus phone number:** 567-4545

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**Collaborators**

**Name:** Somayaji Ramamurthy, M.D.

**Title:** Professor

**Department & Division:** Anesthesiology

**E-Mail:** somayaji@uthscsa.edu

**Campus phone number:** 567-4543

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**Name:** Susan Noorily, M.D.

**Title:** Clinical Professor

**Department & Division:** Anesthesiology

**E-Mail:** noorily@uthscsa.edu

**Campus phone number:** 567-4545

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**Name:** Douglas M. Anderson, M.D.

**Title:** Associate Professor

**Department & Division:** Anesthesiology

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**Campus phone number:** 567-4461

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## ITG Proposal Synopsis

**Project Title:** Dynamic Visual Simulation of the Supraclavicular Nerve Block

**What is the educational problem or need that is addressed by this project? {50 words}**

Peripheral nerve block of the brachial plexus using a supraclavicular approach has wide applicability in providing analgesia for surgery of the upper extremity. However, practitioners are often hesitant to perform or teach this block. The 3-dimensional anatomy of this region is complex and difficult to conceptualize. Landmarks are deep and hard to palpate. Significant complications can occur if the block is not performed properly, including puncturing the lung or major blood vessels.

**What do you propose to do? (briefly describe what you will develop – E.g., what is the product or outcome that will be produced?) {50 words}**

Using the SonoSite®, a portable ultrasound device, we plan to record real-time images of the supraclavicular block for teaching purposes and use them in conjunction with a “virtual” demonstration of the supraclavicular block using computerized 3-dimensional images. We anticipate that this teaching tool will enable anesthesiologists to interpret ultrasonic images of the supraclavicular area.

**What type(s) and numbers of students will directly benefit from this project?**

Anesthesiology residents and medical students would directly benefit from this project. There are approximately 40 Anesthesiology residents in the department and 6-10 medical students rotate on our service each month. In addition, there are members of the faculty who would be willing to participate.

**How will you evaluate the effectiveness of this project? {50 words}**

We plan to do a statistical analysis utilizing a paired t-test to compare the results of the pre-test with the results of the post-test. We will collaborate with a statistician to determine the appropriate sample size and statistical method. If the results of the post-test demonstrate a statistically significant improvement in the ability of the participants to interpret ultrasound images, this will prove that the teaching materials were effective tools.

**Total amount of funding requested:** \$ 10,000.00

**Project Approval by Department Chair:**

**Name:** Christopher Bracken, M.D., Ph.D.

**Department:** Anesthesiology

**Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

# UTHSCSA Innovative Teaching Grants

## ITG Proposal

Your application is expected to answer each of the six questions below. Please read the review criteria on page 6.

1. **Why should this project be implemented?** Discuss the problem, need or deficiency that will be addressed by this project and discuss why it is important to resolve this problem.
2. **What will be developed or implemented?** Describe the product or outcome.
3. **What objective(s) do you hope to achieve by implementing this project?**
4. **What tasks will be performed to complete the project and who will perform each of these tasks?** Describe the plan / methods for completing the work.
5. **How will you evaluate the effectiveness of this project?** Describe how you will evaluate whether or not the project objectives were achieved.
6. **What is your plan for continuation of the project after ITG funding support concludes?**

Other:

- Complete the project budget.
- Develop a logic model for your proposal (example of logic model provided).
- Attach a 2 page biographical sketch of the Project Director.
- Schedule a pre-submission consultation meeting with the ITG Coordinator.

## UTHSCSA Innovative Teaching Grants Budget Request

**Project Director:** D. Martin Bitner, M.D., M.S.

**Title of Proposal:** Dynamic Visual Simulation of the Supraclavicular Nerve Block

		<b>Funds Requested</b>
1. Consumable Supplies (Itemize below)	\$	250.00
2. Equipment (Itemize below)	\$	4,000.00
3. Hourly Rate Services (such as software programming) Must be calculated at an hourly rate.	\$	5,750.00
<b>Example:</b> 30 hrs programming @ \$30/hr = \$900		
4. Other expenses (Itemize precisely)	\$	0.00
<b>TOTAL</b>	<b>\$</b>	<b>10,000.00</b>

### Itemize Expense Items

Consumable Supplies	Equipment	Hourly Rate Services	Other Expenses
Recordable CDs Paper and toner Regional block needles Ultrasound gel	Sonosite® hardware/software Human anatomy (Visible Human Project®) software Multimedia software	Multimedia specialist, 100 hours @ \$50/hr = \$5000 Statistician, 5 hours @ \$50/hr = \$250 Ultrasonographer, 5 hours @ \$100/hr = \$500	

**Travel and equipment:** Budget requests to support travel for presentations at meetings related to an ITG project must be justified in the application. If the grant is funded, travel expenses may not exceed 10% of the total award. If the project budget includes funds for purchasing equipment, the applicant must document that such equipment is not available or accessible at The UTHSCSA.

<p>Define the target population:</p> <p>Who will your program serve?</p> <p><i>Be specific:</i> If age range, SES, geographic location are important, then specify them.</p>	<p>What are the theoretical assumptions you are making about how your program will work?</p> <p>What assumptions are you making regarding:</p> <ol style="list-style-type: none"> <li>1) participants?</li> <li>2) environment?</li> <li>3) staff?</li> </ol>	<p>Resources:</p> <p>What resources does the program have available to achieve the program objectives/ goals?</p> <p>Constraints:</p> <p>What obstacles or challenges might there be? Example: Legal or regulatory constraints</p>	<p>These are the services/interventions that a program provides to fulfill its goals.</p> <p>Activities lead to outputs and are directly related to outcomes.</p>	<p>Outputs are the products of a program's activities such as the number of classes held, the number of home visits made, the number of people attending/completing classes, etc.</p>	<p>Outcomes are the benefits for participants during, or after their participation in your program. Outcomes may be related to, knowledge, skills, attitudes, values, behavior or status.</p> <p>There are usually <i>short-term, intermediate, and long-term</i> outcomes.</p>	<p>Outcome indicators</p> <p>Are the observable, measurable characteristics or changes that result represent the achievement of an outcome.</p>
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## Program Logic Model

### Dynamic Visual Simulation of the Supraclavicular Nerve Block

**Program Goal:**

TARGET POPULATION	ASSUMPTIONS	INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES	OUTCOME INDICATORS
<p>Anesthesia care providers and those in training who have a need to perform regional anesthesia using ultrasound guidance.</p>	<p>Peripheral nerve block of the brachial plexus using a supraclavicular approach has wide applicability in providing analgesia for surgery of the upper extremity. However, practitioners are often hesitant to perform or teach this block. The 3-dimensional anatomy of this region is complex and difficult to conceptualize. Landmarks are deep and hard to palpate. Significant complications can occur if the block is not performed properly, including puncturing the lung or major blood vessels.</p> <p>Noninvasive technologies, such as ultrasonography, allow real-time visualization of anatomical structures with good resolution. The SonoSite®, a portable ultrasound device that has been used as an aid during the performance of regional anesthesia, allows visualization of nerves and vasculature and might improve the outcome and safety of peripheral nerve blocks. However, there is a paucity of educational materials available to teach proper usage. Most anesthesiologists are not familiar with interpreting such ultrasound images. Using the SonoSite®, we plan to record real-time images of the supraclavicular block for teaching purposes and use</p>	<p>Resources: SonoSite® available for use; anesthesia faculty, residents, and medical students are able to participate; the Anesthesiology Department can provide computers.</p> <p>Constraints: need to obtain IRB approval; need appropriate computer software; need assistance of ultrasonographer, computer support personnel, and statistician</p>	<p>With IRB approval, supraclavicular nerve blocks will be performed on several patients implementing the SonoSite® device in order to obtain real-time ultrasonic images of the block. This task will be performed by the investigators and collaborators of the project, possibly to be assisted by an ultrasonographer. We will obtain appropriate 3-dimensional animation software (e.g., Visible Human Project®) of the pertinent anatomy to create the visual simulation images that correlate with the ultrasound images. We will need the assistance of computer support personnel (multimedia specialist/graphics designer), ultrasonographer, and a statistician. Once the teaching materials are prepared, the investigators and collaborators will recruit anesthesiology residents, medical students, and faculty to serve as participants. Participants will take a “pre-test” assessing their ability to</p>	<p>We propose to create a dynamic visual simulation (DVS) of the supraclavicular block of the brachial plexus, incorporating simultaneous real-time ultrasonic images and corresponding computer-generated 3-dimensional anatomical animations in a split-screen format. The product would be available as a compact disc or a form of downloadable software.</p>	<p>Participants will take a “pre-test” assessing their ability to interpret ultrasound images of the supraclavicular region. After the “pre-test” is completed, the electronic teaching materials will be introduced to the participants. Following review of the teaching materials, the participants will take a “post-test” once again assessing their ability to interpret the ultrasound images.</p> <p>Short term: If the results of the post-test demonstrate a statistically significant improvement in the ability of the participants to interpret ultrasound images, this will prove that the teaching materials were effective tools.</p> <p>Long term: It is possible that anesthesia providers who are able to interpret ultrasound images will be more willing to perform supraclavicular blocks with the SonoSite®. It is possible that the success and safety will be improved as well. However, these long term outcomes are not being</p>	<p>An improvement in test scores from the pre-test to the post-test will be the outcome indicator.</p>

## Review Criteria for ITG Proposals

ITG proposals will be evaluated in relation to the applicants' responses to the areas below. A pre-submission meeting with the ITG Coordinator is required.

**1. Description and justification of the problem, need or deficiency**

Why should this project be implemented? What is the problem, need or deficiency that will be addressed by this project? And why is it important to address this problem.

**2. Uniqueness of the project**

What will be developed or implemented and, importantly, why is this approach innovative and likely to enhance students' learning or the quality of their educational experience?

**3. Potential for impact**

What objective(s) do you hope to achieve by implementing this project?

**4. Thoroughness of the work plan.**

What tasks will be performed, how it will be done, and who will do the work?

**5. Appropriateness of the evaluation plan**

Describe how you will evaluate whether or not the project objectives were achieved.

**6. Plan for continuation**

What is the plan for continuation of the project after ITG funding concludes?

**7. Development of a Logic Model**

The logic model is a tool that will provide assistance in the planning and implementation phase of the project.

**8. Pre-submission meeting with the ITG Coordinator**

The ITG Coordinator will certify that the meeting occurred.

# ITG Application Template

**Please complete each section of the application. Please type.**

- 1. Why should this project be implemented?** Discuss the problem, need or deficiency that will be addressed by this project and discuss why it is important to resolve this problem.

The supraclavicular block of the brachial plexus is a very valuable anesthetic technique. However, many practitioners are hesitant to perform or teach this block for several reasons. Despite the availability of textbooks and diagrams, the 3-dimensional anatomy of this region is complex and difficult to conceptualize. The involved landmarks are deep and hard to palpate. Significant potential complications can occur if the block is not performed properly, including puncturing the lung or major blood vessels. New noninvasive technologies, such as ultrasonography, allow real-time visualization of anatomical structures previously identifiable only by surface palpation of anatomical landmarks or nerve stimulation. The SonoSite® is a portable, hand-carried ultrasound device that has been used as an aid during the performance of regional anesthesia. This device allows visualization of peripheral nerves and the surrounding vasculature and therefore might improve the outcome and safety of peripheral nerve block by allowing more accurate placement of local anesthetic and avoiding such complications as vascular puncture or pneumothorax. However, this is an emerging technology and there is a paucity of educational materials available to teach proper usage. Most anesthesiologists are not familiar with interpreting ultrasound images of peripheral nerves and surrounding structures. Since it is possible to record real-time images with the SonoSite® using available hardware and software configurations, we would like to record real-time images of the supraclavicular block for teaching purposes. We hope to use these images in conjunction with a correlating "virtual" demonstration of the supraclavicular block using computerized 3-dimensional images of this anatomical region. We hope that this teaching tool will enable anesthesiologists to learn to interpret ultrasonic images of the brachial plexus.

- 2. What outcome(s) do you hope to achieve by implementing this project?**

This "pilot" project will evaluate a new method of teaching the interpretation of ultrasonic images of the brachial plexus during performance of supraclavicular block. We hope to demonstrate efficacy of this new teaching tool.

**3. What will be developed or implemented? Describe the products or outcomes. Examples: web-based curriculum, CD-ROM, teacher training programs.**

We propose to create a dynamic visual simulation (DVS) of the supraclavicular block of the brachial plexus, incorporating simultaneous real-time ultrasonic images and corresponding computer-generated 3-dimensional anatomical animations in a split-screen format. The product would be available as a compact disc or a form of down-loadable software.

**4. Methods: What tasks will be performed to complete the project and who will perform these tasks? Describe the plan / methods for completing the work.**

In order to complete this project, it will be necessary to perform supraclavicular nerve blocks on several patients implementing the SonoSite® device in order to obtain real-time ultrasonic images of the block. This task will be performed, with IRB approval, by the investigators and collaborators of the project, possibly to be assisted by an ultrasonographer. We would have to obtain appropriate 3-dimensional animation software (e.g., Visible Human Project®) of the pertinent anatomy to create the visual simulation images that would be correlated with the ultrasound images. We will need the assistance of computer support personnel (multimedia specialist/graphics designer), ultrasonographer, and a statistician. Once the teaching materials are prepared, the investigators and collaborators will recruit anesthesiology residents, medical students, and faculty to serve as participants. Participants will take a "pre-test" assessing their ability to interpret ultrasound images of the supraclavicular region. After the "pre-test" is completed, the electronic teaching materials will be introduced to the participants. Following review of the teaching materials, the participants will take a "post-test" once again assessing their ability to interpret the ultrasound images.

**5. How will you evaluate the effectiveness of this project? Describe how you will evaluate whether or not the project objectives were achieved.**

We plan to do statistical analysis utilizing a paired t-test to compare the results of the pre-test with the results of the post-test. We will collaborate with a statistician to determine the appropriate sample size and statistical method. If the results of the post-test demonstrate a statistically significant improvement in the ability of the participants to interpret ultrasound images, this will prove that the teaching materials were effective tools.

**6. What is your plan for continuation of the project after ITG funding support concludes?**

If we meet our objectives, we plan to request funding from the manufacturer of the SonoSite® to continue the development of teaching materials for other peripheral nerve blocks.

## Project Director biosketch:

### CURRICULUM VITAE

Daniel Martin Bitner, M.D., M.S.

Date of Preparation: June 29, 2004

#### I. GENERAL INFORMATION

##### A. Personal Data:

1. Citizenship Status: USA
2. US Social Security No.: 525-25-2877

##### B. Education:

Year	Degree	Institution/Location	
1997	M.D.	University of New Mexico School of Medicine Albuquerque, New Mexico	
1990	M.S.	University of New Mexico Pharmaceutical Sciences Nuclear Pharmacy Concentration Albuquerque, New Mexico	
1986	B.S. Pharm	University of New Mexico Pharmacy Albuquerque, New Mexico	
1984		Certificate in Emergency Medical Technical-Vocational Institute Albuquerque, New Mexico	Technician-BAlbuquerque

##### C. Postgraduate Training:

1997 – 2001	Resident Physician	University of Texas Health Science Center San Antonio, Texas
1997 – 1998	Internship	University of Texas Dept. of Anesthesiology Health Science Center San Antonio, Texas

##### D. Academic Appointments:

2001 – Present	Assistant Professor	University of Texas Dept. of Anesthesiology Health Science Center San Antonio, Texas
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1991 – 1993	Clinical Instructor I	College of Pharmacy Department of Radiopharmacy University of New Mexico Albuquerque, New Mexico
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##### E. Other Employment: