Dear Dr. Christina Doyle and members of the Association of Schools and Colleges of Optometry,

Please consider my application for the Starter Grants for Educational Research Program. The title of the project I am submitting is: “Impact of interactive instructional tools in Gross Anatomy for Optometry Students: a Pilot Study”. This is a new project and I have not submitted it to any additional agency to request for financial support.

In this application package I am including a description of the project, justification of the requested budget and a short version of my CV for your consideration.

Yours truly,

Patricia C. Sanchez Diaz, DVM, PhD
Assistant Professor
Rosenberg School of Optometry, UIW
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II. Description of Educational Research Project

**Background:** Different studies and theories have historically aimed to find the perfect strategy to obtain the best achievements fitting the peculiarities of adult learning. However, it seems that there is not a perfect recipe for success in this matter. Consistent with humanistic and constructivist learning theories, some recent studies have demonstrated the effectiveness of student motivation and of the utilization of interactive experience-based learning methods (constructivism) in anatomy courses. Clinical Anatomy is a challenging discipline for Optometry students. It requires deep knowledge of anatomical structures, function and relations in order for the student to successfully establish the clinical correlates. Classical approaches to learn anatomy have emphasized in the memorization of endless lists of descriptive anatomical terms and features. Prove of this is the also endless and maybe even creative catalog of mnemonics to remember them. New technologies are having a huge impact in teaching and learning techniques. Interactive visual tools are becoming very popular, especially virtual dissections and 3D interactive anatomical models that aim to visualize and to better understand the potential clinical implications of anatomical dysfunction. The aim of the study proposed here is to determine if these web-based tools may have a positive effect in learning outcomes in Optometry Students.

**Hypothesis:** The utilization of audiovisual web-based resources and 3D models may complement the classical instructional tools used in anatomy, may implement the benefit of the laboratory instruction and may provide with a set of valuable review tools that students can access anytime.

**Methods:** 60 first-year Optometry students will be split into two laboratory groups. In both groups, laboratory instruction will be performed for a period of 12 weeks. For the first group of students, traditional methods will be followed based on the use of atlas, textbooks, and anatomical laboratory models. Instruction of the second laboratory group will be supplemented by the addition of interactive and audiovisual tools including dissection, medical procedure, and/or functional anatomy short videos. At the end of each laboratory session, the students will be asked to: i) perform a laboratory evaluation using a standardized questionnaire using a five-point Likert scale to gather student feedback and;
ii) to take a post-laboratory quiz. For normalization purposes, the score the students obtained in each post-laboratory quiz will be divided by the final grade each student obtained in the Gross Anatomy course. The distribution of the relative scores will be compared between both laboratory groups. Statistical differences in students’ scores will be determined using T-test (p<0.05).

**Significance:** To my best knowledge, this is the first study of this kind to be performed within a School of Optometry. The use of interactive tools may have a positive impact in student motivation. Students may become more cognitively engaged and thus improving their performance in this course. Furthermore, a positive outcome in this pilot study will allow us to test similar strategies in additional and more clinical Optometry courses. The potential application of interactive strategies may boost student confidence and, consequently, they may become less dependent on the instructor. Overall this may result in a more efficient utilization of instruction time.

**Timeline:** The study proposed here will be performed during Fall Semester 2011. Analysis and interpretation of the data will be carried out during Spring Semester 2012.

### III. Detailed Proposed Budget

<table>
<thead>
<tr>
<th>Concept</th>
<th>Price per unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>iPad: 3 units</td>
<td>$620</td>
<td>$1,860</td>
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<tr>
<td>Anatomy applications for iPad: 3 units each</td>
<td></td>
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<tr>
<td>Netter’s Anatomy Flash Cards, 3rd Edition.</td>
<td>$40.00</td>
<td>$120</td>
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<td>Gray's Anatomy for Students Flash Cards</td>
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<tr>
<td>Heart Pro (NOVA Series) - iPad edition</td>
<td>$18.00</td>
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<tr>
<td>Skeletal System Pro II - (NOVA Series) - iPad edition</td>
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<td>About Muscle System Pro II - (NOVA Series):</td>
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<tr>
<td>Nervous System - iPad edition</td>
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IV. Curriculum Vitae of Project Coordinator

- **Education and training:**

<table>
<thead>
<tr>
<th>INSTITUTION AND LOCATION</th>
<th>DEGREE (if applicable)</th>
<th>YEAR(s)</th>
<th>FIELD OF STUDY</th>
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<tbody>
<tr>
<td>Facultad de Veterinaria, Universidad de Extremadura, Spain</td>
<td>DVM</td>
<td>1997</td>
<td>Veterinary Science and Medicine</td>
</tr>
<tr>
<td>Centro Nacional de Biotecnologia (CSIC), Madrid, Spain</td>
<td>PhD</td>
<td>2002</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>Hospital Universitario Ramon y Cajal, Madrid, Spain</td>
<td></td>
<td>2003 – Aug 2004</td>
<td>Molecular Biology</td>
</tr>
<tr>
<td>Greehey Children’s Cancer Research Institute, UTHSCSA, San Antonio, TX</td>
<td>Sep 2004 – Jun 24th 2008</td>
<td>Molecular, Cell and Tumor Biology</td>
<td></td>
</tr>
<tr>
<td>Greehey Children’s Cancer Research Institute, UTHSCSA, San Antonio, TX</td>
<td>Jun 24th 2008- present</td>
<td>Molecular, Cell and Tumor Biology</td>
<td></td>
</tr>
</tbody>
</table>

**Positions and Employment**

- Sep 2010- present: Assistant Professor. School of Optometry. UIW. San Antonio, TX.
Project title: *Impact of interactive instructional tools in Gross Anatomy for Optometry Students: a Pilot Study*

ASCO Starter Grants for Educational Research

- Jan 2003 – Aug 2004: Post-doctoral fellow. Fernando BaqueroMochales laboratory, Ramon &Cajal Hospital (SERMAS), Madrid, Spain
- Jan 1999 – Dec 2002: Graduate Student. Jose Luis Martinez Menendez laboratory, Centro Nacional de Biotecnologia (CNB, CSIC), Madrid, Spain
- Nov 1993 – Dec 1998: Student Associate. Department of Animal Health, Facultad de Veterinaria de Caceres (UEx), Spain

Laboratory supervision

- Nov-Dec 2009: Divya Chakravarthy. First year graduate student. 6 weeks rotation.
- Jan-Feb 2010: Erika Lackey. First year graduate student. 6 weeks rotation.

Teaching

- Sept 2010-Dec 2010: Clinical Gross Anatomy and Histology (18 lectures and 12 labs). Rosenberg School of Optometry, UIW. San Antonio, TX
- Jan 2011- May 2011: Ocular Biochemistry and Molecular Biology (13 lectures). Rosenberg School of Optometry, UIW. San Antonio, TX
- Jan 2011-May 2011: Clinical Ocular Anatomy Laboratory (shared with another instructor). Rosenberg School of Optometry, UIW. San Antonio, TX
Scientific Communications to international meetings in the last 5 years (inverse chronological order)


Peer-reviewed publications in the last 5 years (inverse chronological order).
Project title: Impact of interactive instructional tools in Gross Anatomy for Optometry Students: a Pilot Study

ASCO Starter Grants for Educational Research


Participation in Research Projects in the last 5 years (inverse chronological order):

1. Project title: Gene Expression and Bone Biology
   Institution: South Texas Veterans Health Care System
   Funding agency: Veterans Affair Office of Research and Development (VA-ORD)
   Duration: Sep 2010-Sep 2012
   PI: Sherry Abboud-Werner
   Patricia C. Sanchez Diaz: Co-Investigator

2. Project title: Correlative Genetic Markers in Childhood Hepatoblastoma
   Institution: Greehey Children’s Cancer Research Institute, UTHSCSA. USA
   Funding agency: NIH
   Duration: from 29 Sep 2008- 31 Aug 2010
   PI: Gail E. Tomlinson
   Patricia C. Sanchez Diaz: post-doctoral fellow

3. Project title: microRNA and stem-like cancer cells in embryonal tumors
   Institution: Greehey Children’s Cancer Research Institute, UTHSCSA. USA
   Funding agency: San Antonio Area Foundation
   Duration: From Jun 2009-Jun 2010
4. Project title: Dissecting the participation of Musashi1 in brain tumors
Institution: Greehey Children’s Cancer Research Institute, UTHSCSA. USA
Funding agency: San Antonio Cancer Institute and American Cancer Society
Duration: Dec 2006-Dec 2007
PI: Luiz O. F. Penalva
Patricia C. Sanchez Diaz: post-doctoral fellow

5. Project title: Role of the RNA binding protein Musashi1 in medulloblastoma formation
Institution: Greehey Children’s Cancer Research Institute, UTHSCSA. USA
Funding agency: San Antonio Area Foundation
Duration: Jun 2006-Jan 2008
PI: Patricia C. Sánchez Díaz

OTHER

- Member of San Antonio Life Sciences Association
- Associate member of the American Association for Cancer Research
- Associate member of the American Society of Clinical Oncology
- Award to the best academic grades in Veterinary Medicine studies course 1996-1997 ("Primer Premio Nacional para Estudios de Veterinaria") by the Ministerio de Educacion y Cultura. (Published in BOE 12 of May 1998)
- Award “Luis de Cáceres”: for Veterinary Medicine graduates year 1997
- "Ayudas al Estudio de Argentaria” award year 1998
- “Alumna Distinguida” Award by the Universidad de Extremadura for academic year 1996-1997