



## Artistic and Scholarly Development Proposal for Tyler Schwend

**Project Title: Show and Tell: Publishing a Video Methods Article on Corneal Wound Healing and Regeneration**

**1. Cover Page (attached)**

**2. Project Summary:**

The cornea is a dome-shaped, transparent tissue that focuses light as it enters the eye. The

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

cornea is full of sensory nerve endings that are critical for normal cornea function. Damage to corneal tissue and its nerves is common following eye injury. Wounded corneas form opaque

[REDACTED]

that JoVE is compiling entitled *Methods for Generating Corneal Wound Healing Models*. ASD funds are being sought to cover scientific tools and publication costs required to publish the scientific journal article, which will be the end product.

**B. Scholarly Significance of the Project**

*Nature of problem to be examined:*

We all have them and nearly all come with a story. On the hands of a welder they represent a life of hard work. While on an athlete's knee they represent a painful, lost season and a long, tedious recovery. No matter how they are acquired, our scars are visible markings that show off the cuts, scrapes and bruises we accumulate during our life.

While scars on our skin and internal organs are mostly harmless, a scar that forms on the outer-most layer of the eye, the cornea, can have devastating impacts to vision. The cornea is a transparent, window-like tissue that protects the eye by keeping harmful debris from entering the



corrective cornea surgeries, such as LASIK or cornea transplantation? While these corrective surgeries are very successful for improving vision, oftentimes they are associated with eye pain and nagging dry eye lasting for months or even years. The discomfort and dryness that patients experience post surgery is caused by damage to sensory nerves in the cornea. Corneal sensory

nerves, which bring about sensations of touch, pain and temperature, also play vital roles in the blink reflex and tear production<sup>3</sup>. Following damage, regeneration of corneal nerves occurs slowly and is often incomplete. Until these nerves fully regenerate, the patient experiences dry



**C. Professional Significance of the Project**

This project has four clear benefits to my scholarly activities, while also potentially having a big impact on researchers in my field that will be able to learn the technique. First, this publication will help establish my laboratory as one that can make important contributions to the field of corneal wound healing and scar-free corneal regeneration. Though I have used the corneal wound healing technique in my laboratory, I have yet to publish an article using the procedure. Thus, this publication will provide wider visibility to my laboratory as a leader in corneal wound healing in the embryonic chick. As corresponding author, I expect to hear from

[REDACTED]

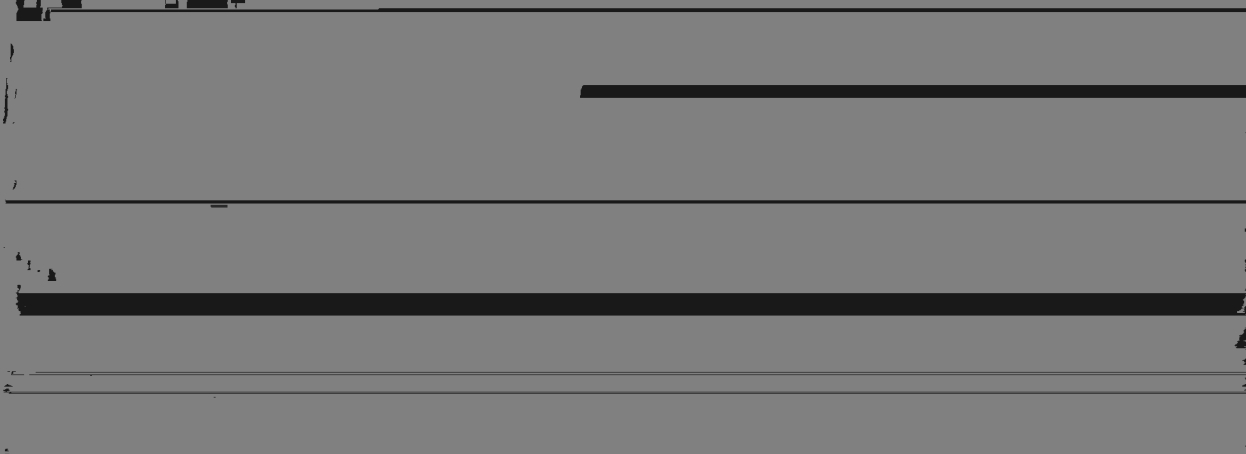
collaborating on the technique.

Second, publication of the methods article will provide credibility to my future grant

**Scientific tools**

The following reagents are required. I am seeking two pairs of forceps, one pair for me and one for my student. These are necessary to dissect away the extra-embryonic membranes from the eye. I am also seeking a new micro-dissecting knife for making the corneal incision. New tools will be necessary to carry out the technique well and we need to have high quality tools for the video. The eggs, syringes and needles are also needed to perform the technique.

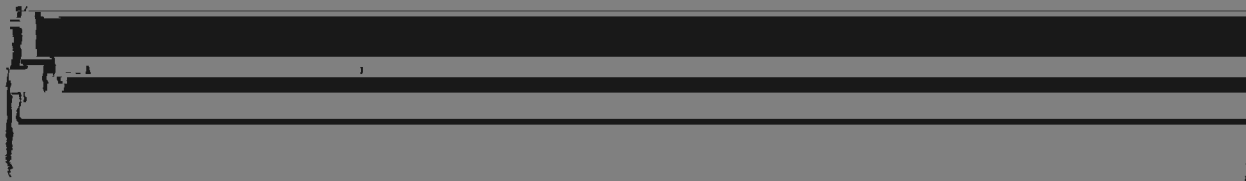
3 dozen fertilized eggs (from University of Illinois poultry)	\$30.00
5 ml syringes (pack of 100 from ThermoScientific)	\$20.00
#18 gauge needles (pack of 100 from ThermoScientific)	\$20.00
#5 Dumont forceps (Biology Dumontert - Fine Sci. Tools) - 4 total	\$260.00



30° Angled Micro-dissecting knife (Fine. Sci. Tools)	\$143.00
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**Proposed timetable**

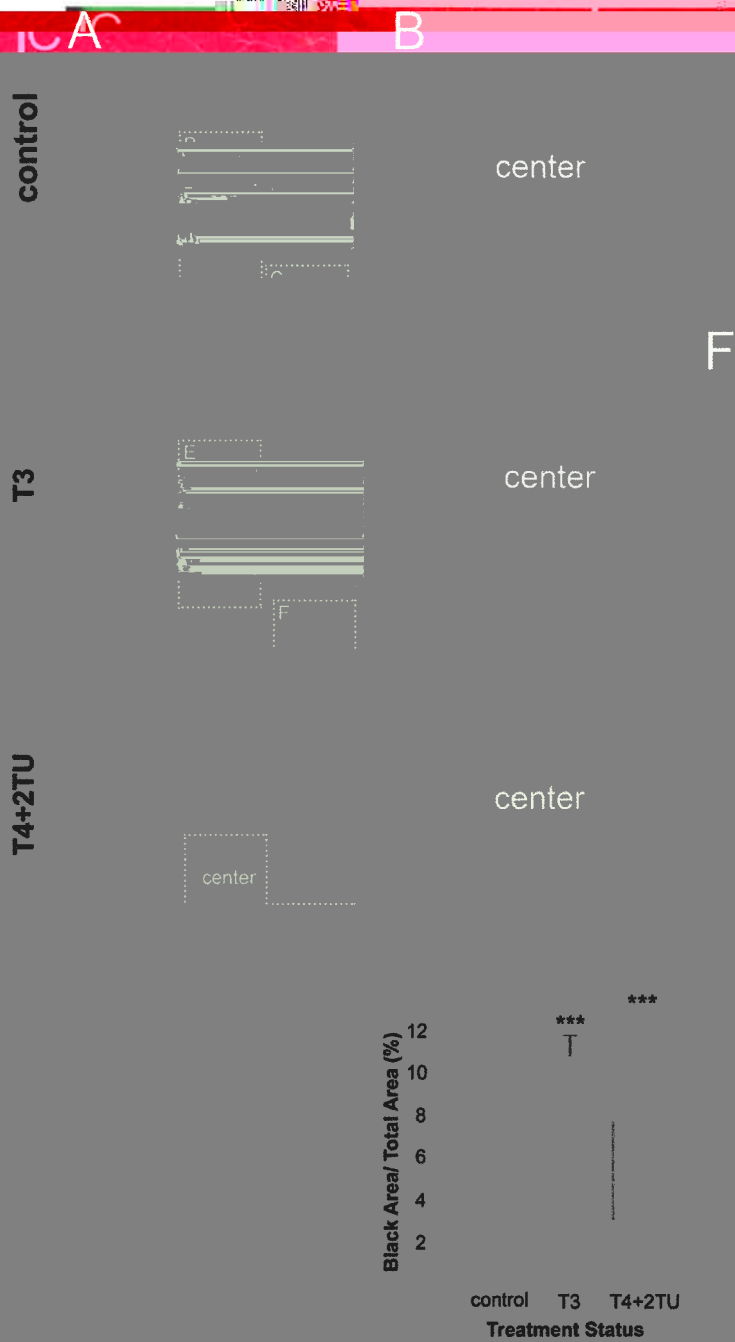
October 2021 - January 2022	Prepare and submit the written manuscript. Due date is November 8 <sup>th</sup> , 2021. Manuscript goes through peer review which typically takes 2-3 months (according to the JoVE editor)
February 2022 - April 2022	PhD level scientists at JoVE prepare a script for the video portion of the publication. I approve the script.
April - May 2022	I will train Manish Pathuri '22 to carry out the technique and work with him to learn the script from JoVE.
	A trained videographer from JoVE will come to Illinois to record Manish (and







**Appendix**



**Figure 1. Thyroid hormone increases the rate of corneal innervation.** (A-C) Corneal nerves (green) are visualized using fluorescent microscopy at daily intervals, beginning at embryonic day 9 (E9) through embryonic day 11 (E11) in control corneas. (D-I) Corneal nerves are visualized at daily intervals (E9-E11) in T3 or T4+2TU-treated corneas. These treatments both effectively raise the levels of thyroid hormone in the chick embryo. Note that nerves in T3 or T4+2TU-treated corneas have extended further toward the corneal center when compared to controls.

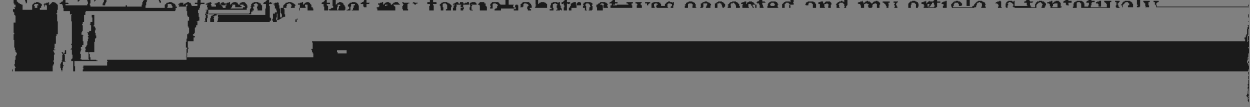
## Email communication with JoVE editor

The following are screenshots of communication between Dr. Neethu Abraham, editor for JoVE and myself. The selected screenshots include:

Sept 10 – The original invitation from Dr. Abraham on behalf of JoVE to submit a methods article. A formal abstract was requested.

Sept 16 – Details about the standard access publishing costs (\$1400) for which I am seeking ASD funds.

Sept 27 – Confirmation that my formal abstract was accepted and my article is tentatively



Methods for generating Corneal Wound Healing Models Unread Inbox X

Neethu Abraham, Ph.D. <neethu.abraham@jove.com> [Unsubscribe](#)  
to me ▾

Sep 10, 2021, 7:01 AM ☆ ↶ ⋮

Dear Dr. Schwend,

In collaboration with our guest editor, Dr. [Yi-Chin Du](#), JoVE is producing a PubMed-indexed collection of video articles on [Methods for Generating Corneal Wound Healing Models](#). This collection will showcase innovative and established methods that set the standard for reproducibility in this field.

Based on your recent publications, we believe that your research would be a valuable addition. If you would like to see your work published in this Methods Collection, please reach to this

[Science Editor](#)

Neethu Abraham  
to me ▾

Thu, Sep 16, 12:51 AM ☆ ↶ ⋮

Hi Dr. Schwend,

<https://www.jove.com/methods-collections/964>

[publishing process and costs](#)

(Emails from JoVE continued)

Neethu Abraham

Sep 27, 2021, 1:42 AM (13 days ago) ☆ ↶ ⋮

to me ▾

Hi Dr. Schwend,

Dr. Di has presented your abstract. Her comments are as follows: "Enhancing cerebral wound is a very useful tool to study cerebral wound healing

Neethu Abraham, PhD  
Science Editor | JoVE

Mumbai Office | 247 Park, Lal Bahadur Shastri Rd, Mumbai  
Headquarters: 1 Alewife Center Suite 200 Cambridge MA 02140 USA

Neethu Abraham

📧 Sep 30, 2021, 2:27 AM (10 days ago) ☆ ↶ ⋮

to me ▾

Hi Dr. Schwend,

[Redacted content]

**Tyler Schwend**

Center for Natural Sciences, C100A

(309)258-0641

[Redacted contact information]

**Professional Experience and Education**

[Redacted text]

[Redacted text]

[Redacted text]

[Redacted text]

Bloomington, IL Illinois Wesleyan University tschwend@iwu.edu

**Associate Professor, Biology** 2021 present  
Illinois Wesleyan University, Bloomington, IL

**Assistant Professor, Biology** 2016 2021  
Illinois Wesleyan University, Bloomington, IL

**Assistant Professor, Biology (tenure track, left position for IWU)** 2015 2016  
Hope College, Holland, MI

**Postdoctoral Fellow, Comparative Biosciences** 2012 2015  
University of Illinois, Urbana, IL \*mentored undergraduates

**Postdoctoral Fellow, Biology** 2010 2012  
Kansas State University, Manhattan, KS

**Ph.D. in Life Sciences** 2004 – 2009  
Northwestern University Feinberg School of Medicine, Chicago, IL

**Bachelor of Science in Biology** 1999 – 2003  
University of Illinois, Urbana, IL

2020 Patel, M., Pham, N., Ziegenhorn, E., Deaton, R.J., Pisano, A., Kim, S., Rajarathnam, V., and T. Schwend. Unique and Overlapping Effects of Triiodothyronine (T3) and Thyroxine (T4) on Sensory Innervation of the Chick Cornea. *Experimental Eye Research* 194:108007.

Zhang, Y., Mao, X., Schwend T., Littlechild, S., and G.W. Conrad, Resistance of  
Corneal PPT/VA Crosslinked Collagen and Small Lensin with Restorane to

Degradation by Matrix Metalloproteinases. *Invest. Ophthalmol. Vis. Sci.* 54(2):1014-1025.

2012 Schwend T., Deaton, R.M., Zhang, Y., Caterson B., and G.W. Conrad, (2012). Corneal Sulfated Glycosaminoglycans and their Effects on Trigeminal Nerve Growth Cone

Selected Awards and Research Grants

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# ASD Grant Budget Page

~~Faculty Name (e.g. Tyler Schwend)~~

**Project Title** Show and Tell: Publishing a Video Methods Article on Corneal Wound Healing and Regeneration

**A. Equipment Description** (please give source of recent estimate) \$0

**B. Supplies and Services** (please itemize) \$~475

Fertile eggs (\$30.00)

Syringes/needles (\$40.00)

~~\_\_\_\_\_ (\$\_\_\_\_\_)~~

Microknife (\$143)

**D. Consultancy Fees** \$0

**E. Living Expenses** (see proposal guidelines) \$0

**F. Student Wages** (see proposal guidelines) \$0

**G. Faculty Stipend** (maximum \$2,000 per faculty Member) \$600

**H. Publication Expenses** \$1400

**I. Other** \$

**TOTAL** \$2,475

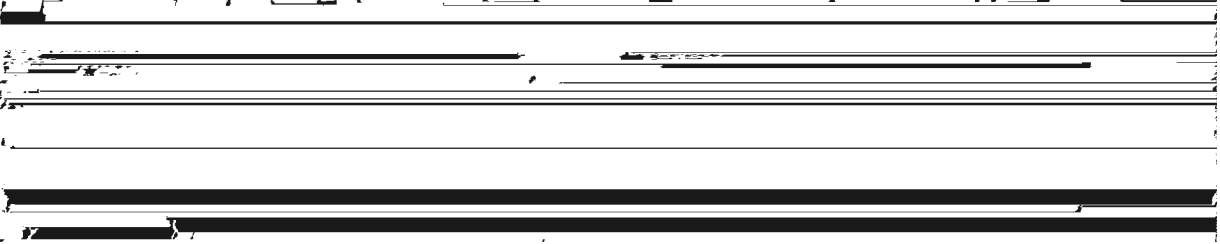


September 16, 2019

Dr. Tyler Schwend  
Department of Biology  
Illinois Wesleyan University  
Bloomington, IL 61701

Dear Dr. Schwend:

This letter serves as an approval of your Protocol 19-009: *Extracellular matrix and diffusible*



Abigail Kerr  
Chair, IACUC

