Applicant’s Name: Toby C. Cornish
Degree: MD, PhD

Applicant’s Division: Pathology Housestaff

Faculty Preceptor: Marc K. Halushka
(Must hold a primary appointment in Pathology)

Appointment Category: X___House Staff ____Clin Fellow ____Research Fellow
________Medical Student _____Graduate Student (Program: _________)

Register for: _____ Clinical Research _____Translational Research _X___Basic Research

Full Poster Title * Color deconvolution for the analysis of tissue microarrays

Where has the work been presented?
Meeting Name Advancing Practice, Instruction and Innovation Through Informatics (APIII)
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Author(s) (First & Last) Cornish, Toby C. and Halushka, Marc K.

In-House Address: 400 Carnegie
(Room # and Building Name, Lab, etc.)

Telephone: 410.955.3980_________ Beeper: 410.434.2824_________
Fax: 410.614.9011_________ E-mail: tcornis3@jhmi.edu___

*INCLUDE A ONE-PAGE ABSTRACT (including title and all authors) OF THE WORK YOU WILL BE PRESENTING

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E-mail COMPLETED Registration form and abstract to:
Stacey Morgan (smorgan9@jhmi.edu) on or before
Friday, March 14th, 2008

If you have questions or problems regarding your submission, please contact Stacey Morgan via e-mail (smorgan9@jhmi.edu)
Color deconvolution for the analysis of tissue microarrays

The tissue microarray (TMA) is a powerful tool for the simultaneous analysis of multiple tissue specimens. TMAs conserve tissue, provide uniform staining conditions, and permit high-throughput preparation and analysis of slides. TMAs are predominantly stained with chromogenic dyes and analyzed manually using traditional grading systems, but digital imaging is increasingly used to quantify immunohistochemical staining of paraffin-embedded tissue. One method, color deconvolution, separates a color digital photomicrograph into component images representing the contribution of each dye. We employ widely-available, free and open source software tools to automate the color deconvolution and analysis of TMA images. Multiple TMAs were constructed from vascular, pulmonary and renal tissues derived from 100 adult autopsies, and immunohistochemistry for connective tissue growth factor (CTGF) was performed. The image dataset, consisting of individual core images, was annotated to create three binary masks: tissue area, inclusion area, and exclusion area. The masks were combined using boolean operations to create a region of interest for analysis. The diaminobenzidene and hematoxylin signals were deconvolved, and the diaminobenzidene signal was measured for each region of interest. The dorsalis pedis core images were also scored manually, revealing strong correlation (Kendall's tau = 0.71) between the observer score and the median diaminobenzidene intensity in each image. Color deconvolution offers an alternative to other methods of analyzing immunohistochemistry on TMA images.