

AUTHORS

AUTHORS (LAST NAME, FIRST NAME): Ploner, Stefan B.^{1, 2}; Moulton, Eric M.^{1, 3}; Waheed, Nadia K.⁴; Husvagt, Lennart²; Schottenhamml, Julia J.^{1, 2}; Lee, ByungKun¹; Hornegger, Joachim^{2, 5}; Duker, Jay S.⁴; Rosenfeld, Philip J.⁶; Fujimoto, James G.¹

INSTITUTIONS (ALL):

1. Electrical Engineering and Computer Science, Massachusetts Institute of Technology, Cambridge, MA, United States.
2. Pattern Recognition Lab, Friedrich-Alexander University Erlangen-Nürnberg, Erlangen, Germany.
3. Health Sciences and Technology, Harvard-MIT, Cambridge, MA, United States.
4. Ophthalmology, New England Eye Center - Tufts University School of Medicine, Boston, MA, United States.
5. School of Advanced Optical Technologies, Friedrich-Alexander University Erlangen-Nürnberg, Erlangen, Germany.
6. Ophthalmology, Bascom Palmer Eye Institute - University of Miami Miller School of Medicine, Miami, FL, United States.

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Study Group:

ABSTRACT

TITLE: Toward quantitative OCT angiography: visualizing flow impairment using variable interscan time analysis (VISTA)

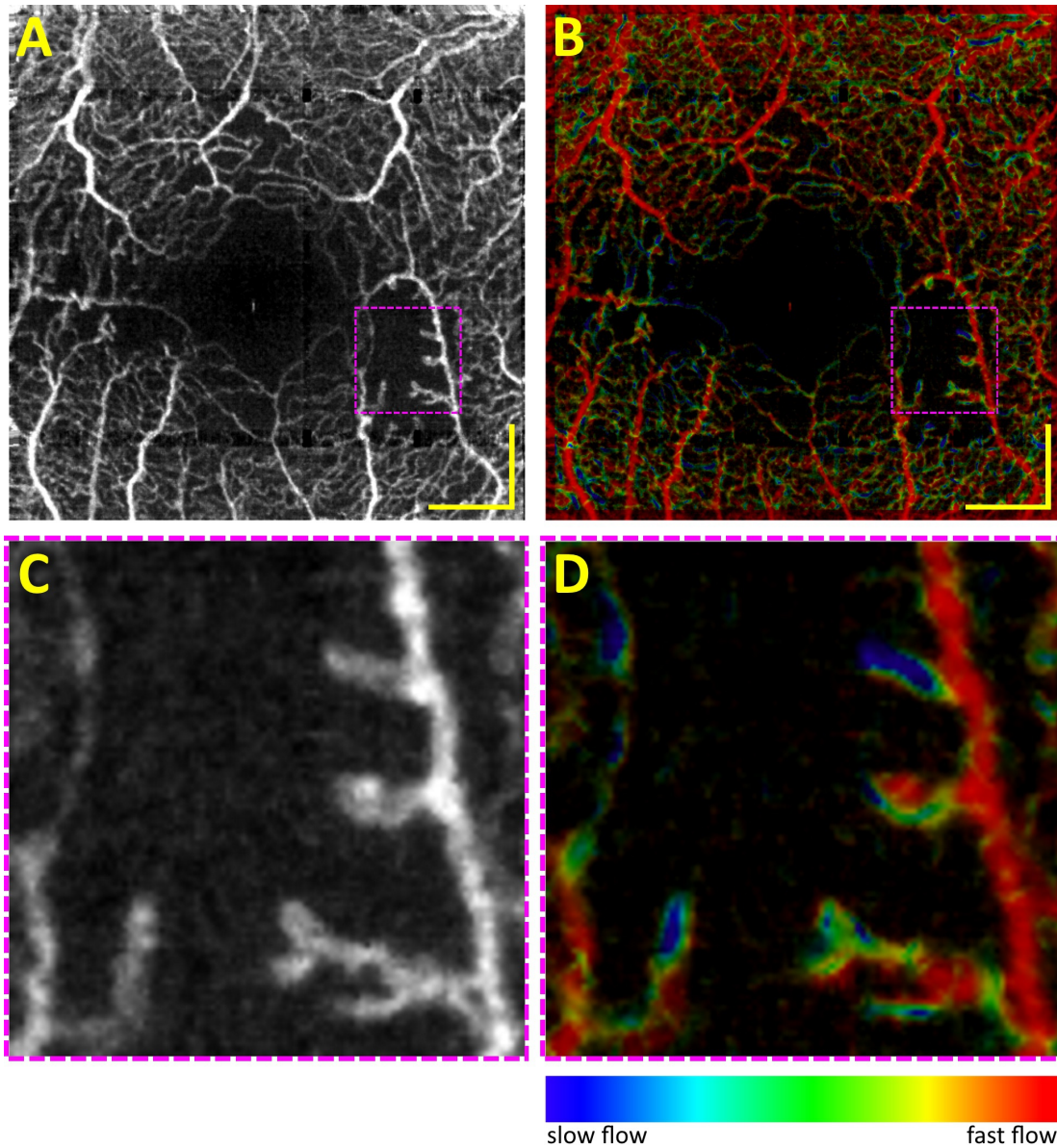
ABSTRACT BODY:

Purpose: Optical coherence tomography angiography (OCTA) is a promising modality for visualizing vascular alterations in a variety of ocular diseases, including age-related macular degeneration (AMD) and diabetic retinopathy (DR). However, most OCTA techniques have limited dynamic range and do not provide information about the relative flow velocities within the imaged vasculature. Visualizing relative flow speed would be especially valuable when assessing diseases in which progression is linked to flow impairment, not just vasculature loss.

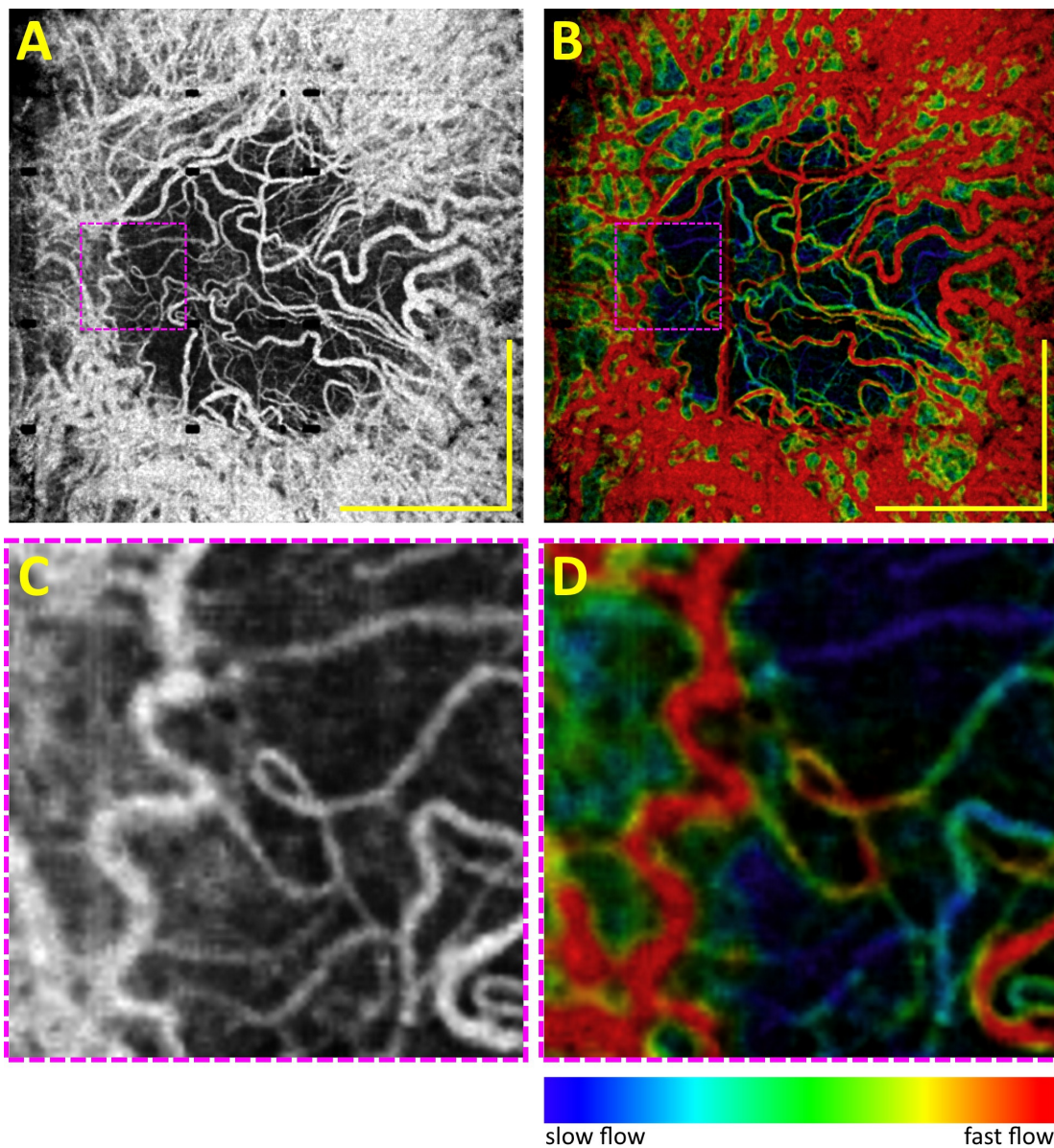
Methods: OCTA imaging of patients with various stages of AMD and DR was performed with a 1050 nm swept source OCT system at a 400 kHz A-scan rate using a 5 repeated B-scan protocol. Variable interscan time analysis (VISTA) was used to compute the OCTA decorrelation data from pairs of B-scans having 1.5 ms and 3.0 ms separations. The two resulting OCTA data sets were used to compute relative flow speeds, which were then mapped to a color space for display.

Results: The VISTA flow maps for a representative patient with non-proliferative DR (NPDR), and for a patient with geographic atrophy (GA) are shown in Figures 1 and 2, respectively. The VISTA map of the NPDR eye shows slower flows associated with capillary loops in the OCTA image. The VISTA map of the GA eye shows slower flows in the area of atrophy, and on the borders of atrophy.

Conclusions: A method for visualizing VISTA OCTA data is developed and used to differentiate flow speeds in DR and AMD eyes featuring GA. Differentiation of flow speeds is an important first step towards quantitative OCTA and may be useful for assessing vascular diseases at a reversible stage.



OCTA and VISTA flow maps of NPDR (51 y/o female). (A) En face projection of the OCTA volume showing the retinal vasculature. (B) Corresponding VISTA flow map. (C) Enlargement of (A), showing a region of intercapillary loops. (D) Corresponding enlargement of the VISTA flow map, showing flow impairment within intercapillary loops. Scale bars: 1 mm.



OCTA and VISTA flow maps of non-exudative AMD with GA (77 y/o male). (A) En face projection of the OCTA volume through a ~ 35 μm slab beginning at the choriocapillaris. (B) Corresponding VISTA flow map. (C) Enlargement of (A), showing selected choroidal vessels within the region of GA. (D) Corresponding enlargement of the VISTA flow map showing flow impairment in some vessels. Scale bars: 1 mm.

DETAILS

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TRAVEL GRANTS and AWARDS APPLICATIONS

AWARDS: ARVO and ARVO Foundation Travel Grants|ARVO Members-in-Training Outstanding Poster Award