BIOGRAPHICAL SKETCH

Born in Iran
B.S. 2007, University of Tabriz, Iran
M.S. 2011, Amirkabir University of technology, Tehran, Iran
Ph.D. 2017, Florida Atlantic University, Boca Raton, Florida

CONCERNING PERIOD OF PREPARATION & QUALIFYING EXAMINATION

Time in Preparation: 2014—2017

Qualifying Examination Passed: Fall 2014

Published Papers:
Hydrodynamics of mangrove-type root models: the effect of porosity, spacing ratio and flexibility , *Journal of Bioinspiration and biomimetic (IOP)*, vol. 17, no. 4, Aug 2017.

On drag coefficient and flow structure downstream of mangrove root-type models through PIV and direct force measurements.: Journal of physical review fluids *(APS)* (Under Review).

Conference:
Kazemi, A., Parry, S., Van de Riet, K. and Curet, O., 2015. The effect of porosity and flexibility on the hydrodynamics behind a mangrove-like root model. Bulletin of the American Physical Society, 60.

Kazemi, A; Curet O 2016 PIV measurements and flow characteristics downstream of mangrove root models APS Division of Fluid Dynamics (Fall) 2016, abstract #D3.005 (Portland: APS Division of Fluid Dynamics (Fall) 2016, abstract #D3.005).

Volumetric Three-Componential Velocity Measurements (V3V) of Flow Structure behind Mangrove-Root Type Models; APS Division of Fluid Dynamics, 2017.

FAU
COLLEGE OF ENGINEERING & COMPUTER SCIENCE
Florida Atlantic University

FLORIDA ATLANTIC UNIVERSITY

COLLEGE OF ENGINEERING & COMPUTER SCIENCE

announces the

Ph.D. Dissertation Defense

of

AMIRKHOSRO KAZEMI

for the degree of

DOCTOR OF PHILOSOPHY (PH.D.)

Aug. 24, 2017 at 9 a.m.

in

Engineering West, Room 187

777 Glades Road

Boca Raton, FL

DEPARTMENT: Ocean and Mechanical Engineering

DISSERTATION TITLE: "Hydrodynamics of Mangrove-Root Models"

CHAIR OF THE CANDIDATE'S PH.D. COMMITTEE:
Oscar M. Curet, Ph.D.

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Davood Moslemian, Ph.D.
Stewart Glegg, Ph.D.
Tsung-Chow (Joe) Su, Ph.D.

ABSTRACT OF DISSERTATION

Hydrodynamics of Mangrove-Root Models

Mangrove trees play a prominent role in coastal tropic and subtropical regions, providing habitats for many organisms and protecting shorelines against high energy flows. In particular, red mangroves, *Rhizophora mangle*, exhibit complex cluster roots interacting with different flow conditions. To better understand the resilience of mangrove roots, we modeled the roots as a collection of cylinders with a circular pattern subject to unidirectional flow. We investigated the effect of porosity and spacing ratio between roots by varying both the diameter of the patch, D, and small cylinders, d. In addition, we modeled hanging roots of red mangroves as rigid cylinders with a cantilever hinge. Force and velocity measurements were performed in a water tunnel (Reynolds numbers from 2200 to 11000). Concurrently, we performed 2D flow visualization using a flowing soap film. We found that the frequency of the vortex shedding increases as the diameter of the small cylinders decreases while the patch diameter is constant, therefore increasing the Strouhal number. By comparing the change of Strouhal numbers with a single solid cylinder, we introduced a new length scale, the effective diameter. The effective diameter of the patch decreases as the porosity increases. In addition, we developed an experimental model for three drag length scales for rigid patch . For flexible cylinders, we found that a decrease in stiffness increases both patch drag and the wake deficit behind the patch in a similar fashion as increasing the blockage of the patch. This information has the potential to help in the development of methods to design resilient bio-inspired coastline structures.