

Jason Haydel Collins III

Civil Engineer (Hydraulics). Email: Haydel.Collins@gmail.com. Website: <https://jhcollins.github.io>

Education & Certification:

Louisiana State University, Baton Rouge, Louisiana, August 2017

Master's Degree in Coastal Engineering, Thesis Option. Graduate GPA: 3.54

Under the advisement of Dr. Clinton Willson

Thesis Title: Quantifying Strength of Floating Marsh & Interaction with Hydrodynamics

Available at: <http://etd.lsu.edu/docs/available/etd-06042017-123347/>

Louisiana State University, Baton Rouge, Louisiana, May 2014

Bachelor's Degree in Environmental Engineering

Dean's List: Spring 2013, Spring 2014.

Oglethorpe University, Atlanta, Georgia, May 2012

Major: Dual Degree Engineering, Minor: Economics

Honors: Oglethorpe Presidential Scholarship Recipient, Honors Seminar

The Louisiana School for Math, Science, & the Arts, Natchitoches, Louisiana, 2009

Licensed Engineering Intern (Louisiana). E.I. # 0033283

Work Experience:

United States Army Corps of Engineers:

Civil Engineer (Hydraulics), May 2017 – Present;

2020 Annual Appraisal: 5 out of 5, Outstanding

2019 Annual Appraisal: 5 out of 5, Outstanding

2018 Annual Appraisal: 5 out of 5, Outstanding

- Served leading & supporting roles for both civil works & military engineering projects.
- Successfully brought in projects and funding from outside sources.
- Provided technical guidance & training to entry level & senior level engineers.
- Published research in the field of CFD modeling & coastal hydraulics.
- Developed software, scripts, & models to assist fellow engineers perform work more efficiently.
- Served a 6-month detail at the Coastal Hydraulics Lab in the ERDC
- Presented multiple educational seminars to fellow employees and team members
- Served in multiple flood fights, hurricane teams, & disaster relief efforts.

Projects:

Military Engineering (Supporting Engineer)

- 3D FSI modeling of the Improved Navy Lighterage System (INLS).
- Analyzed the hydrodynamic loads on the Improved Ribbon Bridge (IRB).
- Developed python Jupyter notebooks for analysis of the IRB shore anchoring system.
- Assisted with physical modeling for the Trident Pier System at the UMaine wave facility.
- Assisted with testing a developmental Discrete Element model called Mosaic at CRREL.
- Assisted HR Wallingford in running their 3D FSI simulations of Semi-Submersible wind turbine base.

South Central Coastal Louisiana Project (Lead Hydraulic Engineer)

- Lead Hydraulic engineer for BBA-18 congressionally authorized study.
- Developed an expanded Atchafalaya River model to assess riverine flooding.
- Utilized existing ADCIRC data to estimate coast-wide surge hazard and risk.
- Provided technical guidance to the multi-disciplinary Project Design Team (PDT)
- Compiled technical reports in support of project design milestones.

Navier-Stokes/Fluid Structure Interaction Community of Practice (Co-Originator)

- Conducted training course on programming with Python and using CFD.
- Assisted in developing Statements-of-Need for agency-wide guidance for CFD modeling.
- Received funding from USACE HQ to do validation comparison of CFD codes.
- Aiming to develop policy and guidance for USACE use of CFD models.

East Atchafalaya Backwater Study (Lead Hydraulic Engineer)

- Developed HEC-RAS model to analyze backwater flooding in the Morgan City, LA area.
- Analyzed multiple alternatives for both riverine and rainfall events.
- Used project as a training opportunity for other engineers in the office.

Upper Barataria Basin (Supporting Engineer)

- Created the 2D HEC-RAS model for the project area with rushed schedule.
- Utilized existing hurricane data to estimate surge inundation.
- Trained a senior engineer on how to model using HEC-RAS.
- Utilized personally developed software to produce synthetic rainfall events.

HSDRRS PCCP Modeling (Supporting Engineer)

- Developed HEC-RAS & Delft-3D models for the 17th St & London Ave pump stations.
- Ran various scenarios analyzing velocities through gate structures & near pump outflows.
- Assisted in reviewing correspondence between contractors and USACE during litigation.

Zydeco Ridge Wave Study (Supporting Engineer)

- Assisted in conducting wave study for borrow pit in Lake Pontchartrain.
- Developed wind conditions for use in AdCIRC + SWAN simulations.
- Ran models on HPC's and post processed figures using Matlab.
- Wrote technical report describing the modeling effort.

Comite Diversion (Reviewer)

- Conducted a technical review of a Delft3D-FM model for Brook's lake area.
- Performed additional Delft3D-FM modeling scenarios for the study.
- Providing technical guidance to employee on detailed assignment.

Lake Maurepas Diversion Project (Reviewer)

- Conducted a technical review of a Delft3D model for the Lake Maurepas diversion study.

Developmental Works and Innovation:

Proteus (Supporting Engineer)

- Work with multi-disciplinary team of researchers and engineers on code development.
- Actively test and troubleshoot new numerical methods developed for use in multiphase flow applications. i.e. the CLSVOF method and immersed boundary methods.
- Developed an effective CFD training repository for new engineers and researchers.
- The open source code can be found here: <https://github.com/erdc/proteus>

HHC-Tools (Lead Engineer)

- Led development of a suite of tools designed to expedite common hydraulic engineering tasks. <https://github.com/jhcollins/MVN>
- Trained fellow engineers in python development, which resulted in their ability to contribute to the toolkit.

South Louisiana Master Model (SLaMM (Co-Developer)

- Worked with coworkers on developing a coast-wide HEC-RAS model.
- The model covers the entire Southern Louisiana watershed and coast, including the Lower Mississippi River, Atchafalaya River, New Orleans flood protection system, etc.
- SLaMM is also utilized as a forecasting tool during hazardous flood scenarios and emergency operations.

Synthetic rainfall time series generator (Developer)

- Developed Python script that will produce rainfall hydrographs built from NOAA ATLAS-14 statistics given duration, AEP, & Lat-Lon.

National historic rainfall time series generator (Co-Developer)

- Wrote Matlab tool that will return rainfall hydrograph given any duration and any Lat-Lon within the continental US.

LSU Department of Civil & Environmental Engineering:

Research Assistant, September 2014 – December 2016

- Conducted Louisiana Board of Regents funded eco-hydraulics thesis research.
- Constructed 3-D hydraulic models with ANSYS FLUENT & Delft 3D-FLOW.
- Utilized LSU's High Performance Computing (HPC) resources for CFD simulations.
- Implemented 2-D, 3-D, & coupled CFD-FEA models involving FSI.
- Designed & tested tensile strength measuring device for material stress-strain analyses.

Fluid Mechanics Lab Instructor, August 2016 – December 2016

- Course instructor for 75 undergraduate Civil Engineering students.
- Lectured on numerous fluid dynamics concepts requiring advanced knowledge.
- Prepared students with rigorous technical writing & scientific presentation exercises.

Teaching Assistant, August 2015 – May 2016

- Tutor & grader for 150+ Civil Engineering students for Fluid Mechanics Lecture CE 2200.
- Provided weekly office hours for students in need of assistance on assignments.

Conestoga, Rovers & Associates (Now GHD):

Engineering Student Worker Internship, November 2012 – June 2014

- Coordinated with Professional Engineers & managers on various civil engineering projects.
- Reviewed design landfill drainage networks for clients such as Chevron & Valero.
- Created reliable & reusable pipe flow calculation programs for employees.

Research & Publications:

Papers:

- Manuel Quezada de Luna, J. Haydel Collins, Christopher E. Kees
An unstructured finite element model for incompressible two-phase flow based on a monolithic conservative level set method. International Journal for Numerical Methods in Fluids, 03 February 2020. <https://doi.org/10.1002/fld.4817>
- Dimakopoulos, Aggelos; Sklia, Maria; Collins, J. Haydel; Kees, Christopher; de Lataillade, Tristan
Advanced Wave Generation Systems for Numerical Modelling of Coastal Structures. In: Goseberg, Nils; Schlurmann, Torsten (Hg.): Coastal Structures 2019. Karlsruhe: Bundesanstalt für Wasserbau. S. 712-722. https://doi.org/10.18451/978-3-939230-64-9_071.

Theses:

- Haydel Collins
Method for Quantifying Floating Marsh Strength and Interaction with Hydrodynamics. LSU Master's Theses. 4615. 2017 https://digitalcommons.lsu.edu/gradschool_theses/4615

Talks:

- *Using computational fluid dynamics in overtopping analysis*.
July 2020, USACE Coastal Working Group Seminar, New Orleans District, LA, USA
- *Multiphase Flow Applications using Proteus*.
August 2018, CHL Research Forum Seminar, Coast Hydraulics Laboratory, Vicksburg, LA, USA
- *Quantifying Thin Mat Floating Marsh Strength and Interaction with Hydrodynamic Conditions*
June 2016, State of the Coast, New Orleans, LA, USA

Posters:

- Haydel Collins, Maria Sklia, Max Agnew, David Fertitta, Aggelos Dimakopoulos, Matt Halso, Chris Kees.

Applying a multi-scale decoupled modeling approach to evaluation of New Orleans flood defenses. AGU Ocean Sciences 2020, San Diego, CA. February 16-20

- Christopher E. Kees, Jason H. Collins, Tristan de Lataillade
Level Set Methods for Modeling Air-Water-Grain Interactions at the Microscale.
AGU Fall Meeting 2019, San Francisco, CA. December 09-13
- Jason Haydel Collins, Charles Sasser, Clint S Willson
Quantifying Thin Mat Floating Marsh Strength and Interaction with Hydrodynamic Conditions
AGU Fall Meeting 2016, San Francisco, CA. December 16
- Jason Haydel Collins, Charles Sasser, Clint S Willson
Quantifying Thin Mat Floating Marsh Strength and Interaction with Hydrodynamic Conditions
LSU Graduate Research Conference, Louisiana State University, Baton Rouge, LA. February 2016

Other:

- *International Assoc. for Hydro-Environmental Engineering Research* The Hague, NED July 2015
- *WERC Engineering Competition* Las Cruces, NM. April 2014

Technical Skills:

Programming Languages:

Python, Matlab, HTML. LaTeX

Version Control and Package Manager Utilities:

Git (CLI), Anaconda

2D Modeling Software:

HEC-RAS, Delft-3D FLOW, Delft-3D FlexMesh, SWAN, SMS.

3D Modeling Software:

Proteus, ANSYS Fluent, ANSYS Mechanical, ANSYS AQWA.

High Performance Computing:

Systems: Excalibur, Topaz, Onyx, SuperMikeII, Garnet.

OS: Linux, Ubuntu

Other:

ArcGIS, Arcpy library. Jupyter Notebooks, Heroku

Awards:

- Achievement Medal for Civilian Service: PCCP 2019, Col Clancy.
- Achievement Medal for Civilian Service: Debris Team Puerto Rico 2018, Col Clancy.
- Certificate and Medal of completion: ERDC U 2018, Dr. David Pittman.
- Medal Award for Excellence: ERDC U 2018, Col Clancy.
- Certificate of Completion: Hurricane Nate Response 2017, Col Clancy.
- Certificate of Completion: Flood Fight 2017, Col Clancy.

References:

- Christopher Kees, PhD
CSRS Distinguished Professor
Department of Civil and Environmental Engineering, Louisiana State University
LSU Center for Computation and Technology
Email: cekees@lsu.edu
- Clinton Willson, PhD PE
Mike N. Dooley, P.E. Professor
Department of Civil and Environmental Engineering, Louisiana State University
Email: cwillson@lsu.edu
- Amena Malene Henville, PE
Hydraulics and Hydrology Chief Engineer, United States Army Corps of Engineers: New Orleans District
Email: Amena.M.Henville@usace.army.mil