

## Jason Haydel Collins III

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

### Education & Certification:

**Duke University**, Durham, North Carolina, August 2021 - Present  
PhD Student in Computational Mechanics

**Under the advisement of Dr. Guglielmo Scovazzi**

**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 – July 2021;

**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 17 th 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/flid.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](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](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, Coastal 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](mailto: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](mailto: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](mailto:Amena.M.Henville@usace.army.mil)