Haydel Collins
GS-0810-11
Civil Engineer (Hydraulic)

Education & Certification:

Louisiana State University, Baton Rouge, Louisiana, August 2017
Master's Degree in Coastal Engineering, Thesis Option. Graduate GPA: 3.55
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 Outstanding
2019 Annual Appraisal: 5 Outstanding
2018 Annual Appraisal: 5 Outstanding

- Served leading & supporting roles for both military engineering & civil works projects.
- Successfully brought in projects and funding from outside of the district.
- Provided technical guidance & training to entry level & senior level engineers.
- Currently publishing 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 Lunch and Learns to fellow employees and team members
- Served in multiple flood fights, hurricane teams, & disaster relief efforts.

Projects:

Military Engineering (Supporting Engineer)

- Analyzed the hydrodynamic loads on the Improved Ribbon Bridge (IRB).
- Developed python Jupyter notebooks for analysis of the IRB shore anchoring system.
- The IRB is featured on the cover of "Engineer: The Professional Bulletin of Army Engineers" May-August 2018.
- Assisted with physical modeling for the Trident pier system at the U Maine wave facility.
- Assisted with testing a developmental Discrete Element Model called Mosaic at CRREL with Dr. Arnold Song.
- Collaborated with HR Wallingford in running 3D FSI of moored floating objects.

South Central Coastal Louisiana (Lead Hydraulic Engineer)

- Developed an expanded Atchafalaya River model to assess riverine flooding.
- Utilized existing hurricane data to estimate surge inundation.
- Provided technical guidance to the PDT & collaborated successfully with other branches.
- Compiled reports for AMM and presented to MVD for an IPR.
- Developed programs to automate the development of hydraulic subunits in ArcGIS.

Proteus Development (Lead Hydraulic Engineer)

- Created 2-D stepped spillway simulation for 1d-2d-3d guidance document for HQ.
- Currently training two senior engineers in CFD modeling with HPC's.
- Building 3D simulation to assist in CHL's tilting flume design effort.

Navier-Stokes/Fluid Structure Interaction CoP (Co-Originator)

- Assisted in developing Statements-of-Need for USACE 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.

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.

East Atchafalaya Backwater Study (Lead Hydraulic Engineer)

- Wrote a PMP for the Scope of work required for the modeling study.
- Analyzing alternatives for flood protection east of the Atchafalaya river.
- Including entry level engineer and a DA intern for training purposes.

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.
- Provided full documented report on entire modeling effort.

Additional Projects (Guidance and support role)

- Produced historic rainfall hydrographs for Houston Delft-3D model and WLSP.
- Providing Delft-3D training for Port Of New Orleans Deepening Study.
- Assisting Water Management with HEC-RAS model of the Atchafalaya Basin.

Developmental Works and Innovation:

SLaMM (Co-Developer)

- Worked with coworkers on developing a district wide HEC-RAS model.
- Presented work for branch lunch & learn and ED management.
- Have consistently updated model with new details after projects are completed.

Synthetic rainfall time series generator (Developer**)**

- Python script that will produce a rainfall hydrograph given duration, AEP, & Lat-Lon.
- This has been used on WSLP, SCCL, & UBB.

National historic rainfall time series generator (Co-Developer**)**

- Matlab script that will return rainfall hydrograph for any duration and any Lat-Lon.
- Full database of historic national rainfall is being incrementally built on the H&H server.
- This has been used on WSLP, SCCL, UBB, & Houston.

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:

International Journal for Numerical Methods in Fluids, Co-Author 2019

- *An unstructured finite element model for incompressible two-phase flow based on a monolithic conservative level set method*

COPRI Conference, Co-Author 2019

- *Advanced wave generation systems for numerical modelling of coastal structures*

CHL Research Seminar, Vicksburg, MS August 2019

- Gave talk on various CFD applications involving Proteus.

American Geophysical Union Fall Conference, San Francisco, CA. December 2016

- Eco-Hydraulics Session Poster Presentation on Hydraulic flow interaction with floating marsh.

State of the Coast, New Orleans, LA. May 2016

- Gave talk presenting thesis research to expert audience of scientific professionals.

International Assoc. for Hydro-Environmental Engineering Research The Hague, NED July 2015

- Attended conference & completed weeklong engineering workshop at TU Delft.

LSU Graduate Student Research Conference. Baton Rouge, LA. March 2016

WERC Engineering Competition Las Cruces, NM. April 2014

- Presented capstone design bench scale model of electrolysis based struvite extraction system.

Relevant Technical Skills:

Programming Languages:

Python 2.7, Python 3.7, Matlab.

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.

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 Reponse 2017, Col Clancy.
- Certificate of Completion: Flood Fight 2017, Col Clancy.