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Instruct/Multimedia Developer

Jorge Gonzalez Garcia
University of South Florida, jgonzale@usf.edu

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JORGE GONZALEZ GARCIA

RESUME

3D Applications Engineer and Heritage Specialist

Digital Heritage and Humanities Collections

University of South Florida Libraries

4202 East Fowler Ave. LIB120

Tampa, Florida 33620

jgonzale@usf.edu

(813) 974-0613

EDUCATION

1992 Industrial Design Educational Program, Technical Drawing Specialist, Grade 1. The National Polytechnic Institute in Madrid, Spain, accredited by the Spanish Council of Education and Science. Two academic year Technical Associate program.

1995 Industrial Design Educational Program, Technical Drawing Specialist, Grade 2. The National Polytechnic Institute in Madrid, Spain, accredited by the Spanish Council of Education and Science. Three academic year Technical Associate program.

2010 Professional Master's Diploma in Specialized Audiovisual Production with Autodesk Maya. The CICE Professional School for New Technologies, Spain. Academic year program.

2018-2019 Expert Course in Virtual Reality with Unreal Engine, Campus Editeca School for Design, Architecture, and Engineering. Academic year program.

- Course in Virtual Reality with Unreal Engine
- Advanced course in Virtual Reality with Unreal Engine

SELECTED WORK EXPERIENCE

1995 PYCSA S.A., a construction and design for public and private energy sustainability projects. Conducted 3D data collection and software processing for 3D modeling of landscape topography for road construction project.

1995 ABAD Industrial S.A., industrial manufacturing and electrical testing company for the automotive and aeronautical sectors. Independent contractor designed electrical test systems for automotive industry.

1996 CYMCA, design of custom piping systems for steam collection, transference, and recycling for major industries. Design and development of automated processes and piping systems for steam transfer.

1997 IBERDROLA, developer of sustainable processes and digital transformation in the energy sector. Designed and engineered industrial buildings and electric transfer towers.

1998 SEEFAME, software training company. Independent contractor as company's lead trainer in industrial design CAD software (I-DEAS, Integrated Design and Engineering Analysis Software), a computer-aided design software package.

1999-2003 CIMATECH, a major manufacturing design software company. Designed and developed specialized software for 3D applications. Technical expert and lead customers' trainer.

2003 Talleres Bocanegra, research and technical design company for factory automation. Employed to work with 3D robotics, CMC robotic routers, pneumatics, and hydraulics to design manufacturing tools for automotive industry.

SELECTED HERITAGE PRESERVATION AND DOCUMENTATION EXPERIENCE

2004-2008 ARTEMISA, a Conservation of Artistic Patrimony (CPA) subsidiary, company director overseeing the preservation and restoration of Spanish heritage and patrimony.

2008-2009 University of Burgos, Designed and instructed faculty and students in heritage programs using 3D and spatial technologies and applications.

2009-2015 Founder and owner of Digital Version 3.0, a private company conducting a wide range of 3D architectural and artistic heritage projects. Selected projects include, but not limited to:

- 3D scanning and modeling at the UNESCO World Heritage Site in the Sierra de Atapuerca archaeo-palaeontological complex (Spain). Also, served as 3D multimedia developer for the application of new technologies at the Museum of Human Evolution.
- 3D scanning and modeling at the UNESCO World Heritage Sites of Siega Verde and Las Sereas, Spain.
- Advanced Composites SA, Arevalo, Avila, Spain. Contracted as expert in 3D design and machine engineering.
- 3D specialist in laser scanning and virtual reconstruction of Cultural Heritage for the Department of Science and Geography at the University of Burgos, in Spain.
- 3D scanning, modeling, and video production of ancient and historic Spanish heritage. Museo Arqueologico Regional, Madrid, Spain.
- Instructor of 3D techniques of heritage restoration and conservation to architects and preservation specialists. Spanish governmental agency of (Junta de) Castilla y Leon.
- 3D scanning and documentation of the landscape and caves of Atapuerca World Heritage Site for the Carlos III Institute at the University of Madrid.
- Documented sculptures and facades at the Temple of Debod in Madrid, the Royal Palace in Toledo, and the Cathedrals in Burgos and León.
- 3D scanning and modeling of Roman sculptures in Clunia, Spain.
- 3D scanning and modeling of the Tomb of Sen-en-Mut in Luxor, Egypt

2014-2019 3D Applications Engineer and Heritage Specialist, University of South Florida, Digital Heritage and Humanities Collections (DHHC), USF Libraries. 3D. Duties include planning and carrying out international heritage documentation projects and digital data management. Supervisor of DHHC 3D scanning staff specialists. Conducting short, medium, and long-range terrestrial laser scanning, multiple structured light scanning, photogrammetry, reflectance transformation imaging, gigapixel and thermal photography. Responsible for reality capture, 3D software, modeling, rendering, and visualization. Selected projects include, but not limited to:

- Armenian Heritage and Social Memory Program (2014 to present) Documentation and visualization of Medieval architecture in cooperation with the Armenian Apostolic Church for preservation, restoration, and global educational and architectural research programs:
 - Haghpat Monastery Complex, Lori (UNESCO World Heritage Site)
 - Basilica at Kasagh, Aparan

- Ahktala Monastery, Lori
 - St. Peter and Paul Churches, Akunk
 - Matosavank Church, Dilijan
- Cape Canaveral Air Force Station, Brevard County, Florida. Documentation and visualization of historic launch complexes of the U.S. Space Program. U.S. Department of Defense. Products used for public outreach and education as well as potential preservation or retortion efforts by the U.S. Air Force and Department of Defense.
- U.S. National Park Service and the Southeast Archeological Center (2014 to present):
 - Castillo de San Marcos, St. Augustine, Florida. Digital documentation of the oldest and largest masonry fort in the continental United States. Designed for preservation, restoration and management planning. Several educational and promotional programs are resulting from this work.
 - Fort Pulaski, Cockspur Island Lighthouse, Savannah, Georgia. Documentation and visualization of a Civil War Era lighthouse that is under extreme natural and anthropomorphic threats. Results used for restoration and preservation efforts by NPS managers.
 - Ninety Six National Historic Site. Modeled Revolutionary War architectural features and subterranean tunnels that are closed to the public for outreach, education, and museum exhibitions.
 - Elliott Sugar Mill Ruins. The oldest sugar mill in Florida, early 18th Century British period mill site and the associated plantation landscape. Created 3D models and CAD drawings
 - Fort Frederica National Monument, St. Simons Island, Georgia. Used multiple types of 3D scanning and photogrammetry to record, model, and reproduce numerous early 18th century artifacts for education and museum exhibition.
 - Close Range Laser Scanning, Imaging, and CT Scanning of a Bone Tool Artifact Assemblage, Everglades National Park, Florida. Multiple types of 3D scanning (i.e., white and blue structured light, computed tomography (CT scanning), photogrammetry). Modeling and preparation of assemblage for research and education.
- 3D digital data collection and modeling of numerous artifacts at the Tampa Bay History Center and the Bishop Museum, Florida. Results for museum research and public education and outreach programs.
- Smithsonian Institution, Washington, D.C. 3D digital data collection, modeling, and potential reproduction of:
 - Traditional and sacred objects of Tlingit Clans, Juneau, Alaska for clan use in tribal education and ceremonies.
 - 250-year old Hawaiian canoe. Oldest Hawaiian canoe in existence. Results to be used for research and education by the Smithsonian and native Hawaiian groups for re-teaching traditional canoe production methods.
 - Key Marco archaeological artifacts from Marco Island, Florida. Several irreplaceable 700-year old artifacts recovered by archaeologist Frank Hamilton Cushing in 1896 were recorded using 3D scanning and photogrammetry. Models and reproductions used for museum exhibitions, public outreach, and scholarly research.
- Mexico National Institute of Anthropology and History (INAH)
 - Cascajal Block, Veracruz. Carved stone tablet possibly containing the oldest (c. 1000 BC) evidence of writing in Mesoamerica. Collected and modeled data have added substantial new information regarding some of the earliest writing in Mexico for international research and collaboration.
 - Chalcatzingo, Morelos. Series of Formative period (c. 1200 to 600 BC) in-situ bas-relief stone

- sculptures and architectural features that are major elements in determining the rise and spread of early societies in Mesoamerica. 3D data, models, and reproductions have been used for international research and museum exhibitions.
- El Marquesillo, Veracruz. Olmec monumental throne (c. 450 BC). 3D scanning and photogrammetry of rare Olmec throne. Data used by international researchers.
 - La Venta, Tabasco. Olmec monumental sculpture (c. 900 to 600 BC). Major Middle Formative period Olmec capital recognized for its monumental stone sculpture. 3D data collection, modeling, and reproductions used by scholars and educators for international research and teaching.
 - Guatemala National Institute of Anthropology and History (IDAEH)
 - Quiriguá Ruins and Archaeology Site, Izabal. Documented largest corpus of Classic period Maya hieroglyphic texts on largest carved stone monuments in the Maya World. Major project on a remarkable scale to acquire several types of 3D data and photogrammetry. Imagery, models, and reproduction used for planning, preservation, and restoration. International collaborative research, public education and outreach, and museum exhibitions are resulting from the work of this project.
 - Documented Spanish Colonial architecture in the UNESCO World Heritage Site of Antigua. 3D CAD drawings and models can be used by city planners and architects for preservation and restoration.
 - Guatemala Nacional Museum of Archeology and Ethnology. Documented and modeled numerous Pre-Columbian artifacts and art. 3D models, imagery, and reproductions used for research and education programs in the U.S. and Guatemala.

Publications, Professional Presentations, and Acknowledgements

Collins, Lori, Travis Doering, and Jorge González

2020 Examining Accretion and Shoreline Landform Changes with Terrestrial Laser Scanning at the Fort Pulaski National Park: The Cockspur Island Lighthouse. The Southeast Archeological Center, Tallahassee, FL; the U.S. Department of the Interior, National Park Service, Washington, D.C. (Forthcoming)

Collins, Lori, Travis Doering, and Jorge González

2020 Reality Capture Approaches to Digital Heritage Documentation of Museum Collections and Heritage Landscapes at Fort Frederica National Monument. National Park Service, Washington, D.C. (Forthcoming)

Collins, Lori, Travis Doering, and Jorge González

2020 Reality Capture Approaches to Digital Heritage Documentation of Museum Collections and Heritage Landscapes at Fort Frederica National Monument. U.S. Department of the Interior, National Park Service, Washington, D.C. (Forthcoming)

Córdova Tello, Mario, Travis Doering, Lori Collins, Carolina Meza Rodriguez Jorge González Garcia

2020 *Zona Arqueológica Chalcatzingo, Morelos, Mexico Sculpture Project. The 3D register and its contributions to conservation in Chalcatzingo. Cuadernos del Sur*, volume 2, Digital Humanities. (Forthcoming)

Jorge González García

2019 University of South Florida's USF World "Outstanding Global Engagement Team Award" to acknowledge outstanding global contributions and achievements made during the 2018-19 academic that increased student success and impacted the global footprint of USF.

Collins, Lori, Travis Doering, and Jorge González

2019 The Use and Potential Misuse of Public 3D and Spatial Heritage Data from Our Nation's Parks. U.S. Department of the Interior, National Park Service, Washington, D.C.

Doering, Travis, Lori Collins, Jorge González, Mario Córdova Tello, and Carolina Meza Rodríguez

2019 *The Cascajal Block 3D Digitization Project, Veracruz, Mexico*. The Mexican Council of the National Institute of Anthropology and History (INAH), Mexico City.

Collins, Lori, Travis Doering, and Jorge González

2018 Remote Sensing: LiDAR, GPS, and GIS Examination of Cattle Mound Archaeological Sites in Congaree National Park. Southeast Archeological Center, Tallahassee, Florida; the U.S. Department of the Interior, National Park Service, Washington, D.C.

Collins, Lori, Travis Doering, and Jorge González

2017 De Soto National Memorial GPS and Terrestrial Laser Scanning Survey. Southeast Archeological Center, Tallahassee, Florida; the U.S. Department of the Interior, National Park Service, Washington, D.C.

Collins, Lori, Travis Doering, and Jorge Gonzalez

2017 Examining Erosion with a Terrestrial Laser Scanning Survey of the Russell Cave Rock Shelter, Russell Cave National Monument. University of South Florida Libraries' Digital Heritage and Humanities Collections (DHHC), the Piedmont South Atlantic Coast Cooperative Ecosystems Studies Unit (CESU) (Task Agreement #P15AC01817), the Southeast Archeological Center (SEAC), Tallahassee, Florida and National Park Service, Washington, D.C.

Collins, Lori, Travis Doering, Richard McKenzie, Garrett Speed, and Jorge Gonzalez

2017 Mapping, Condition Assessment, and Interpretation Planning for the Bear Lake Mounds Archeological District, Everglades National Park. University of South Florida Libraries' Digital Heritage and Humanities Collections. The Southeast Archeological Center (SEAC), Tallahassee, Florida and National Park Service, Washington, D.C.

Collins, Lori, Travis Doering, J. Duvernay, J. McLeod, J. González, S. Fernandez, and G. Speed

2015 *Terrestrial and Airborne LiDAR Digital Documentation of Kosciuszko Mine, Ninety Six National Historic Site*. U.S. Department of the Interior, National Park Service, Washington, D.C.

Iniarte Aviles, Eneko, Elena Santos Ureta, and Jorge Gonzalez Garcia

2012 Los Ragos y Procesos Karsticos de la Cueva de Askondo (Mañaria, Bizkaia) [The Traits and Karstic Processes of the Cave of Askondo]. In *La cueva de Askondo (Mañaria): Arte parietal y ocupación humana durante la Prehistoria* [In *The Cave of Askondo (Mañaria): Cave art and human occupation during prehistory*. Kobie: Archaeological Excavations in Bizkaia, the cave of Askondo (Mañaria, Bizkaia), BIA volume 2.

Professional and Conference Presentations

González, Jorge and Joseph Conrad

2019 Methods of Digitization of Sacred Tlingit Clan Objects. Invited presentation at the Tlingit Clan "Sharing Our Knowledge Conference." Presented in cooperation with the Smithsonian Institution, Washington, D.C. Juneau, Alaska, September 25 to 28.

Doering, Travis and Jorge González

2018 Preserving Armenian Heritage: Art and Architecture. Invited lecture presented at the National University of Architecture and Construction of Armenia, Yerevan, Armenia.

González, Jorge, Travis Doering, and Maria Noelia Garcia

2018 Digital Documentation and Preservation of the Renaissance Tombs from the Monastery of San Francisco in Cuéllar, Spain. Invited presentation to The Hispanic Society of America, New York, New York.

González, Jorge and Travis Doering

2017 3D Digital Preservation of the Art and Architecture of Colonial Antigua, Guatemala. Invited presentation to the Patronage for the Conservation, Restoration and Rehabilitation of the Monumental Complex of San José Cathedral of La Antigua Guatemala (Patronato pro Conservación, Restauración y Rehabilitación del Conjunto Monumental de San José Catedral de La Antigua Guatemala). Antigua, Guatemala.

Cordova Tello, Mario, Travis Doering, Lori Collins, Jorge González and Carolina Meza Rodriguez

2016 El registro 3D de la escultura en Chalcatzingo y sus alcances en la conservación (The 3D record of the sculpture in Chalcatzingo and its scope in conservation). Paper presented at the Congreso de patrimonio cultural y nuevas tecnologías (Congress of Cultural Heritage and New Technologies), Mexico City, Mexico.

Acknowledgements

University of South Florida Innovative Education and Digital Heritage & Humanities Collections, and the United States Air Force

2019 Our Last Chance: Preserving Cape Canaveral. Video on the digital preservation of our nation's space history at Cape Canaveral Air Force Station. University of South Florida, Tampa, Florida

Collins, Lori and Travis Doering

2016 3D Heritage Documentation and GPS Survey of Chalcatzingo, Morelos, Mexico. Chalcatzingo Archaeological Site Project. Mexican National Institute of Anthropology and History and INAH Centro Morelos. Mexico City.

Domínguez-Rodrigo, Manuel and Enrique Baquedano (Editors)

2014 La Cuna de la Humanidad (The Cradle of Humankind) Volume I, Regional Museum of Archaeology and the Museum of Human Evolution, Burgos, Spain.

Benito Batanero, Juan Pedro, Alberto Sanz Aragonés, Carlos Tabernero Galán

2012 *La estación rupestre al aire libre de Siega Verde: nuevas técnicas para documentar viejos grabados* [Siega Verde's outdoor rock station: new techniques for documenting old engravings].

Actas VIII International Congress, Innovation in Heritage. Center of Conservation and Restoration of Cultural Objects of Castile and Leon, Valladolid, Spain

Memberships and Organizations

- The International Council on Monuments and Sites (US and International ICOMOS) is the only global non-government organization dedicated to promoting the application of theory, methodology, and scientific techniques to the conservation of the architectural and archaeological heritage. Members contribute to improving the preservation of heritage, the standards and the techniques for each type of cultural heritage property: buildings, historic cities, cultural landscapes and archaeological sites.
- CIPA Heritage Documentation (International Committee of Architectural Photogrammetry) Members of this select committee develop principles and practices for the recording, documentation and information management for all aspects of cultural heritage. Through use of specialized tools and state-of-the-art techniques of measurement and visualization sciences members support of the preservation and conservation of cultural heritage. (membership pending)
- Association for Preservation Technology International, full member. APT's mission is to advance appropriate traditional and new technologies to care for, protect, and promote the longevity of the built environment and to cultivate the exchange of knowledge throughout the international community.
- APT International Documentation Committee (TC-Doc) member. Qualified members of this committee address and teach about the current tools and methods used in survey and documentation (e.g., laser and infrared scanning, photogrammetry, photography, hand measurement, urban inventory and mapping, resource survey, and other new and emerging tools or methods being used in the industry). Members review available software and hardware with the intention of establishing and promoting data management best practices and data standards for the industry.
- Open Heritage Alliance, founding committee member, <https://openheritage3d.org/>
- National Trust for Historic Preservation, full member
- Florida Trust for Historic Preservation, full member

Skills and Expertise

Based on nationally recognized Proficiency Scales, I have achieved Advanced or Expert levels with the following hardware each of which requires special expertise and is used for different types of applications and deliverable products (Please see NIH proficiency scale below):

- FARO Focus x130 and x330 Laser Scanner, long-range terrestrial laser scanner for architecture and landscapes (<1.5 mm accuracy)
- FARO LS880 Laser Scanner, mid-range terrestrial laser scanner for architecture and landscapes (<2.5 mm accuracy)
- FARO Scan Arms, metrology arm technology, 8-Axis 3D measuring arm for small to medium size objects ($\pm 35 \mu\text{m}$ /micron accuracy)
- Leica Geosystems RTC 360 Laser Scanner, long-range terrestrial laser scanner for architecture and landscapes (<1.5 mm accuracy)
- Minolta VIVID 9i 3D Digitizer, 3D triangulation scanner for small to medium size objects ($\pm 50 \mu\text{m}$ /micron accuracy)

- Artec EVA Structured White Light Scanner, for small objects (0.1 mm accuracy)
- Artec Spider Structured Blue Light Scanner, for fine work (0.05 mm accuracy)
- Artec Leo VCSEL light technology (0.1 mm accuracy)
- NextEngine Ultra HD 3D Scanner (0.127 mm accuracy)
- Metris Krypton k610 ($\pm 40 \mu\text{m}$ /micron accuracy)
- Creaform EXASCAN ($\pm 40 \mu\text{m}$ /micron accuracy)
- Robotic milling machines, KUKA and ABB for replication milling processes that require trajectory planning and control.
- 5 Axis CNC Routers refer to number of directions in which the cutting tool can move. On a 5-axis machining center, the cutting tool moves across the X, Y and Z linear axes as well as rotates on the A and B axes to approach the workpiece from any direction (corporate instructor on the operation and use of multiple routers)
- Computed Tomography (CT) Scanners are a form of tomography in which a computer controls the motion of the X-ray source and detectors, processes the data, and produces the image.
- 3D Printers (each has specific advantages for multiple applications and requires specialized data processing and materials)
 - 3D Systems Project CJP360
 - 3D Systems Project CJP760 plus
 - Makerbot Replicator+
 - Formlabs Form 2
 - Raise 3D Pro plus

Based on nationally recognized Proficiency Scales, I have achieved Advanced or Expert levels with the following software programs. Each requires specialized knowledge and are used for discrete applications (Please see NIH proficiency scale below):

- Geomagic Studio 2015, comprehensive reverse engineering software, combines history-based CAD with 3D scan data processing
- Geomagic Wrap 2017, powerful tool for transform 3D point cloud scan data and imported files into 3D polygonal and surface models.
- Geomagic Verify, inspection software for contact and non-contact measurement with CAD intelligence to define and verify alignments, dimensions, and tolerances.
- Geomagic Design X, comprehensive 3D Scan-To-CAD reverse engineering software for creation of feature-based, editable solid models compatible with existing CAD software.
- Materialise Mimics V19, advanced segmentation tool for specific-device design or image-based research and development.
- Artec Studio Professional V10/V11/V12/V13, advanced data capture and processing algorithms
- Cimatron eV13
- Roboris CNC Software, IRBCAM
- Leica TLS software
- Leica JetStream ProjectVault
- Leica Cyclone and CloudWorx
- Faro Scene V5/V6/V7/2018
- Faro Point Sense / Virtusurv v18
- Cloud Compare V2.9
- Bentley PointTools

- City Engine 2016.1
- Autodesk ReMake
- Autodesk ReCap
- Autodesk AutoCad 1993 to 2019
- Autodesk Maya 2010 to 2019
- Pixologic Zbrush 4r8/2018
- 3D Print Software of Makerbot and 3D Systems Cube 3D Printers
- Adobe After Effects cc 2017
- Adobe Lightroom cc 2017
- Color Checker Passport Color Profile
- Adobe Muse cc 2017
- Adobe Photoshop cc 2017
- Adobe Illustrator
- Digital artistic modeling
- Rapid prototyping

Competencies Proficiency Scale

The NIH Proficiency Scale is an instrument used to measure one's ability to demonstrate a competency on the job. The scale captures a wide range of ability levels and organizes them into five steps; from "Fundamental Awareness" to "Expert". This scale serves as the guide to understanding the expected proficiency level of top performers at each grade level.

Score	Proficiency Level	Description
1	<i>Fundamental Awareness</i> (basic knowledge)	You have a common knowledge or an understanding of basic techniques and concepts. <ul style="list-style-type: none"> • Focus is on learning.
2	<i>Novice</i> (limited experience)	You have the level of experience gained in a classroom and/or experimental scenarios or as a trainee on-the-job. You are expected to need help when performing this skill. <ul style="list-style-type: none"> • Focus is on developing through on-the-job experience; • You understand and can discuss terminology, concepts, principles, and issues related to this competency; • You utilize the full range of reference and resource materials in this competency.
3	<i>Intermediate</i> (practical application)	You are able to successfully complete tasks in this competency as requested. Help from an expert may be required from time to time, but you can usually perform the skill independently. <ul style="list-style-type: none"> • Focus is on applying and enhancing knowledge or skill; • You have applied this competency to situations occasionally while needing minimal guidance to perform successfully; • You understand and can discuss the application and implications of changes to processes, policies, and procedures in this area.

4	Advanced (applied theory)	<p>You can perform the actions associated with this skill without assistance. You are certainly recognized within your immediate organization as "a person to ask" when difficult questions arise regarding this skill.</p> <ul style="list-style-type: none"> • Focus is on broad organizational/professional issues; • You have consistently provided practical/relevant ideas and perspectives on process or practice improvements which may easily be implemented; • You are capable of coaching others in the application of this competency by translating complex nuances relating to this competency into easy to understand terms; • You participate in senior level discussions regarding this competency; • You assist in the development of reference and resource materials in this competency.
5	Expert (recognized authority)	<p>You are known as an expert in this area. You can provide guidance, troubleshoot and answer questions related to this area of expertise and the field where the skill is used.</p> <ul style="list-style-type: none"> • Focus is strategic; • You have demonstrated consistent excellence in applying this competency across multiple projects and/or organizations; • You are considered the "go to" person in this area within outside organizations; • You create new applications for and/or lead the development of reference and resource materials for this competency; • You are able to diagram or explain the relevant process elements and issues in relation to organizational issues and trends in sufficient detail during discussions and presentations, to foster a greater understanding among internal and external colleagues and constituents.
		<p>https://hr.od.nih.gov/workingatnih/competencies/proficiencyscale.htm</p>