

# Ibrahim Ibrahim

Design Technologies Researcher and Prototyper

📍 Cambridge, MA, USA

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## Summary

Ibrahim Ibrahim is a designer, interaction technologies prototyper and digital fabrication engineer working at the intersection of product design, human-computer interaction research, and machine craft. He focuses on the development of intuitive tools for designers, creating smart and responsive environments, and how the collaboration between human and artificial intelligences can enhance the design process. He has expertise in technology-driven innovation, smart cities, intelligent logistics infrastructure, digital twins, synthetic data, parametric modeling, and analysis-driven creative solutions. In architectural and software alike, he strives for a balance between optimization, rigor, and originality in the end product, bringing a background in design thinking to land billion-dollar initiatives through technical innovation, clear communication, and positive team culture.

## Education

### Masters of Design Technologies

Harvard University Graduate School of Design (GSD) · Cambridge, MA · Aug 2021 - Present (Expected May 2023) · 4.0/4.0

Dean's Merit Scholarship

Launching Technology Ventures; Simulation & Digital Twins; Human-Centered Artificial Intelligence (AI); Human-Computer Interaction (HCI)

### Computer Science - Cross Registered

Massachusetts Institute of Technology (MIT) · Cambridge, MA · Aug 2021 - Present · 5.0/5.0

Machine Learning (ML); Creative ML for Designers; Advances in Computer Vision; Wireless Sensing; Creative Machines & Robotics; Extended Cognition

### Bachelors of Architecture

American University of Sharjah (AUS) · Sharjah, UAE · Aug 2012 - May 2017 · 3.86/4.0

Sheikh Khalifa Merit Scholarship

Computational Design; Smart Cities; Advanced Digital Fabrication

## Experience

### Creative Technologies Intern

Deeplocal

Pittsburgh, PA, May 2022-Aug 2022

- Developed a game that introduced computer science concepts to children between ages 3 and 5 for Google at the Iowa State Fair. Programmed in JavaScript and NodeJs.
- Designed interactive story telling prototypes at four sites within the circulation at the Google Charleston East headquarters in California.
- Generated novel approaches to spatial and experience design by developing human-computer interaction concepts, including novel interfaces, sensing, data collection techniques and advanced data intelligence.
- Prototyped artificial intelligence tools and computer vision techniques on how the built environment can be more responsive and adaptive to users.
- Increased the conversion rate by 4% by working with design and software teammates to implement prototype and production projects using a combination of web technologies and interactive installations.
- Improved team productivity by 20% by creating and evangelizing a design system, standardized workflows, and improving communication.

### Technology Research Assistant

Harvard University REAL (Responsive Environments & Artifacts Lab)

Cambridge, CA, May 2022-Present

- Contributed as a main author to a paper accepted to SIGraDi 2022 Conference: "Mental Breadcrumbs: Using biometric methods to understand how emotions and sensory cues affect wayfinding".
- Collected and analyzed qualitative and quantitative data from a user research with study with 30 participants, including brain EEG signals, created a variety of visualization techniques, and used the data to develop design recommendations for technology in products and spaces.
- Researched qualitative and quantitative human experiences during travel on various mobility modes.

### Venture Incubation Program Fellow | Sketchli

Harvard Innovation Labs

Cambridge, MA, Aug 2022-Present

- Accepted into Harvard University Innovation Labs (i-labs) 2022 venture program.
- A machine learning sketch-to-search mobile platform for fashion products online shopping.
- Developed user interface prototypes and wireframes to improve the experience and quality of hand sketching on mobile screens.
- Proposed the mobile application software architecture and search algorithms, resulting in a 20% improvement in search speed, and the possibility of scaling to over 10 million products.
- Developed a new business model, pitch deck, created a market analysis, competitor study, financial forecast and gathered customer feedback.

## Computational Project Architect

Morphosis Architects  
Los Angeles, CA, Aug 2019–Oct 2021

- A lead member on the Line project in NEOM, KSA. A \$500 billion sustainable urban development to house up to 6 Million people.
- I researched smart cities, digital infrastructure, logistics infrastructure, mobility networks, city scale Artificial Intelligence integration, sustainability and building performance methods and data architecture.
- Developed generative design models for urban morphologies, distribution, and terrain navigation. Created software prototypes, procedures and workflows that resulted in a 20% increase of productivity.
- Built a digital twin with a custom framework, which allowed for analysis of the building, simulation of the environment, training of datasets and real-estate development.
- Optimized the mobility infrastructure spine by incorporating multiple transportation modes, protected nature reserve and steep terrain which reduced the construction cost by SAR 1 billion and tunneling construction time by 9 months.
- Led the socio-economic population distribution, data analysis, and project phasing strategies through the design and implementation of a system of equations to place the residents in the most spatially efficient way possible.
- Delivered exhibition and presentations for clients that included visuals, data, AR/VR experiences & interactive media by converting ideas into actionable elements and executed them, with a team of producers, designers and developers.

## CTO, Co-Founder

DAIMLAS  
Toronto, Canada, May 2020–Aug 2021

- Proposed a searching and matching algorithm based on highly networked systems to connect AI talent to teams, and teams to global projects, increasing AI team accessibility, the efficiency and quality of the selection process by 10% while reducing the hiring friction for companies by 25%.
- Managed core team and interns to successfully launch the beta version of the platform with market evaluation in North America and Middle East.
- Evaluated market analysis and fit in North America and the Middle East.
- Collaborated with the 10 clients and 3 teams to receive direct feedback on the platform testings and wrote business proposals to attract top talents and investors successfully.
- Awarded first place at the MIT 2020 Hackathon in the Knowledge Economy and selected as MENA region top 20 startups at the MIT Arab Startup Demo Day.

## Technology Research Fellow

College of Architecture, Art & Design (CAAD), AUS  
Sharjah, UAE, Aug 2018–Sep 2019

- Quantified the impact of digital technologies on people, autonomous cities, data accessibility and the construction industry.
- Researched novel digital design methodologies that increase efficiency by 40% through implementing non-linear workflows between design software, robotics, CNC machines, and robotic arms.
- Optimized architectural designs of double curved surface buildings by applying AI and Machine Learning algorithms to reduce material consumption by 25% and therefore construction by 10%.
- Taught digital design software, human-computer interaction (HCI), human-machine interaction (HMI) and GPU based visualization classes.

## Researcher

UAE National Pavilion at the Venice Biennale  
Dubai, UAE, 2019

- Pavilion won the Golden Lion Award at the Venice Architecture Biennale 2021.
- Conducted research on Sabkha salt formations in the northern regions in the UAE to find new sustainable materials alternatives to concrete.
- Ran simulations of digital material samples using FEM analysis tools and real time simulation software.
- Developed parametric tools to generate pavilion scale form finding techniques, assembly logics and fabrication files.

## Intern Architect

Morphosis Architects  
Los Angeles, CA, Jan–Jul 2018

- Designed and planned projects and programs of several scale. Unicorn Island master plan competition (won), Orange County Museum of Arts (under construction), Sunset Mixed-use development (tower), and Hsinta Ecological Power Plant competition (awarded first place).
- Lead fabricator on an indoor aluminum structure to find solutions to reduce its weight, construction challenges and fabrication time.
- Developed aluminum and rubber sheet folding mechanism that reduced the weight by over 60% from solid aluminum blocks.

## 3D Digital Designer

OylerWu Collaborative  
Los Angeles, CA, May–Aug 2016

- Designed the first set of the Active Inlay studies. Exploring the relationship between sectionally trapped masses and volumes.
- 3D modeled multi-part complex forms and geometries with embedded assembly logic and locking mechanisms.
- Produced CNC milling compatible geometries and shell 3D printing files.

## Architectural Intern

Ensamble Studio  
Madrid, Spain, Jun–Aug 2015

- Proposed architectural solutions and interventions for MIT's new dormitory extension in Cambridge, using 3D scanning software and hardware prototyping.
- Developed sustainable methods for structural optimization, natural light strategies, and energy conservation techniques using digital solar and energy analysis and physical models.

## Select Projects

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### 3D Environment Perception for Autonomous Dual-UAV Coordinated Navigation in Indoor Environments with Digital-Twin Simulator and Synthetic Data Generation

Advances in Computer Vision · CSAIL, Massachusetts Institute of Technology · Cambridge, MA, May 2022

### ARSketchNET : Real-time 3D Mesh Reconstruction and Editing from Conceptual 3D Sketches in Augmented Reality using Neural Implicit Learning

Creative Machine Learning for Designers · Computation, Massachusetts Institute of Technology · Cambridge, MA, May 2022

### Mental Breadcrumbs: Using Biometric Methods to Understand How Emotions and Sensory Cues Affect Wayfinding

SIGraDi · INVIVIA · Cambridge, MA, August 2022

### Common Realm: Signal-to-Image Biometric Enabled Memory

Responsive Environment: Poetics of Space · Harvard Graduate School of Design · Cambridge, MA, May 2022

### Interverse: A Spatialized Communication Platform for an Equitable In-person & Remote Presence

Artifacts as Media: Signals, Data, Information, and Technology · Harvard Graduate School of Design · Cambridge, MA, May 2022

## Academic Experience

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### Teaching and Research Fellow

Harvard University  
Cambridge, MA, Jan 2022-Present

- Developed and taught a class of 25 engineering students on computational workflows, software and hardware rapid prototyping through integrating design, computer science, electronics, human-computer interaction and art.
- Increased student enrollment by 25% by introducing workflows to fabricate programmable projects and scientific research.
- Delivered a curriculum on tools, electronic circuits, programming, 3D CAD, embedded micro-controller programming, and wireless networking (Internet of Things) through a lecture series of 12 classes.
- Received the highest teaching evaluation score in the department for the Spring 2022 semester.

### Robotic Arm Research Assistant

Digital Fabrication Labs (CAAD, AUS)  
Sharjah, UAE, Jan-May 2019

- Conducted research on incremental sheet metal forming using custom developed software, robotic arms and computational design software for the design and fabrication of a large-scale metal structures.
- Generated accurate parametric tool paths that increased production by 20% and reduced failures by 80% using 3D modeling, python, and excel.
- Developed advanced robotic fabrication classes for 20 students and introduced new teaching methods for challenging concepts in computational design by utilizing a combination of parametric design and digital fabrication tools such as Rhino and Grasshopper).

### Digital Fabrication Engineer

Digital Fabrication Labs (CAAD, AUS)  
Sharjah, UAE, Aug 2015-May2017

- Assisted students with digital fabrication machines including Kuka robotic arms, CNC routers, and 3D printers.
- Prepared simulations, CAM tool paths and KRL files for fabrication using multiple design software.
- Performed weekly and monthly maintenance of machines.

### Art & Architectural History Teaching Assistant

American University of Sharjah  
Sharjah, UAE, Sep2013-Dec 2016

- Taught two art and architecture history for a class of 304 students. Prepared course materials, lecture slides, quizzes and graded exams.

## Skills

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**Research** · Product Development & Management, Design Thinking, Data Analysis, Prototyping, Startup, User-Centric Research, UI, UX

**Programming** · Python, C, C++ Arduino

**Machine Learning** · PyTorch, torchvision, NumPy, OpenCV, Pandas, Git, Jupyter, GANs

**Development** · JavaScript, TypeScript, ThreeJs, NodeJs, P5.js, HTML, CSS, SQLite, Flask

**3D CAD** · Rhino, Grasshopper, Blender, Autodesk Fusion 360, Autodesk Maya, Autodesk AutoCAD, Bentley Microstation, Z-brush

**Visualization** · Figma, V-ray, Maxwell, Keyshot, Unreal Engine, Unity, Illustrator, Photoshop, InDesign, AfterEffects, PremierPro

**Digital Fabrication** · Electronics Design, Mechanical Design, Kuka Robotic Arms, CAM Software, 3D-Printing, Laser, 3D Scanning

## Select Awards

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### Harvard University Dean's Merit Scholarship

Harvard University · 2021–2023

### MIT Hackathon · First Place in the Knowledge Economy Track

Massachusetts Institute of Technology · May 2020

### Zagreb Observation Tower · First Runner-up

Zagreb · 2018

### Inaugural Emaar Research Fellowship

American University of Sharjah · 2018

### Middle East Emergent Designer Award

Van Clef & Arpels + Tashkeel Studio · 2017

### Sheikh Khalifa Merit Scholarship

American University of Sharjah · 2016–2017

### Dean's Award for Academic Excellence

American University of Sharjah · 2017

### Sheikha Manal Young Artist Award · First Place

Dubai Art Culture · 2017

### MAD · Motivation Attitude Dedication Award

American University of Sharjah · 2016

### Chancellor List

American University of Sharjah · 2012–2017

## Exhibitions & Conferences

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### MADAR · Casts

Dubai, UAE · Nov 2019

### ASCA · Painterly Assemblies

Denver, CO · Mar 2018

Madrid, Spain · Jun 2018

### Amman Design Week · Object-s

Amman, Jordan · Oct 2017

### Dubai Design Week · 5 degrees

Dubai, UAE · Nov 2017

## Certification & Involvement

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### LebNet

Member · Cambridge, MA · Aug 2021 – Present

### LIFE Lebanon

Scholar · London, UK · Aug 2021 – Present

### Harvard Building Science Hub

Member · Cambridge, MA · 2021 – Present

### Stanford Women in Data Science

Ambassador · San Francisco, Ca · 2020 – Present

### Licensed / Registered Architect

Syndicate of Engineers, Lebanon · 2017

United Arab Emirates · 2017

### American Institute of Architecture Students (AUS Chapter)

President · Sharjah, UAE · 2016–2017

### Student Council at AUS

College Representative · Sharjah, UAE · 2014–2015