# Farid Cheraghi's Curriculum Vitae

Assistant Professor of GIS
f.cheraghi@cet.ui.ac.ir
fcheraghi@ut.ac.ir
faridcher@gmail.com
Homepage
Google Scholar
Researchgate
Github
StackOverflow
Address: Room 20, Building 1,
Department of Civil Engineering,
University of Isfahan, Iran

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## Education and Academic Research Experience

- Mar2013-Mar2018, Ph.D., Research Assistant, Remote sensing and GIS, University of Tehran, Iran. I ranked 2 among 96 applicants in PhD university entrance exam in Civil-Surveying-GIS group. I was awarded a grant from the Iranian Ministry of Science, Research and Technology (MSRT) to conduct part of my PhD research as a visitor at university of Maryland College Park USA between September 26, 2016 and July 1, 2017.
- Sep2009-Mar2012, M.Sc., Research Assistant, Civil Engineering–Geospatial Information System, Faculty of Engineering, University of Tehran, Iran. I ranked 7th among 1350 (top 0.5%) applicants in the national MSc university entrance exam in civil-surveying major.
- Sep2005-Aug2009, B.Sc., Civil Engineering–Surveying, Faculty of Engineering, University of Tehran, Iran. Thesis title: Terrestrial LIDAR point-cloud data processing. I ranked 4194th among 329828 applicants (top 1%) in the national BSc university entrance exam in math and physics group.
- Sep2004-Aug2005, High School diploma, Math and Physics, Shohadaye Kargar High School, Tehran, Iran.

## Publications


Timothy Barrey, Eliezer Gurarie, Farid Cheraghi, Ilpo Kajola, and Willliam F. Fagan. Does dispersal makes the heart grow bolder? variation in habitat selection across wolf life history. *Journal of Animal Behavior*, 166:219–231, August 2020. ISSN 0003-3472. URL https://doi.org/10.1016/j.anbehav.2020.06.015.

Farid Cheraghi, Mahmoud Reza Delavar, Farshad Amiraslani, Kazem Alavipanah, Eliezer Gurarie, Stephane Ostrowski, Luke Hunter, Houman Jowkar, and William F. Fagan. Inter-dependent movements of *Acinonyx jubatus venaticus* and *Panthera pardus saxicolor* in a desert environment (mammalia: Felidae). *Zoology in the Middle East*, 65(4):283–292, June 2019. ISSN 0939-7140. URL https://doi.org/10.1080/09397140.2019.1632538.

Faridedin Cheraghi. ESRI association with open source: Is it free too? In Naveenchandra N. Srivastava, editor, *Emerging Trends in Open Source Geographic Information Systems*, chapter 4, pages 73–96. IGI Global, 2018a. ISBN 9781522550396. URL http://doi.org/10.4018/978-1-5225-5039-6.ch004.

Faridedin Cheraghi, Mahmoud Reza Delavar, Farshad Amiraslani, Seyed Kazem Alavipanah, Eliezer Gurarie, and William F. Fagan. Statistical analysis of Asiatic cheetah movement and its spatio-temporal drivers. *Journal of Arid Environments*, 151:141–145, April 2018a. ISSN 0140-1963. URL https://doi.org/10.1016/j.jaridenv.2017.12.003.

Eliezer Gurarie and Farid Cheraghi. *marcher: Migration and Range Change Estimation in R*, 2017. URL https://cran.r-project.org/package=marcher. R package version 0.0-2.

Farshad Hakimpour, Farid Cheraghi, and Jamshid Maleki. An evaluation of data models and algorithms in moving object databases (in Persian). *Journal of Geomatics Science And Technology*, 3(2):27–41, 2013. ISSN 2322-102X. URL http://jgst.issge.ir/article-1-28-fa.html.

Faridedin Cheraghi and Mohammad Ali Rajabi. A Bluetooth-Based indoor LBS system. In Maria Antonia Brovelli, Suzana Dragicevic, Songnian Li, and Bert Veenendaal, editors, *WebMGS 2010: 1st International Workshop on Pervasive Web Mapping, Geoprocessing and Services*, Como, Italy, August 2011. ISPRS WG IV. URL https://www.isprs.org/proceedings/XXXVIII/4-W13/.

Farid Cheraghi, Abbas Abedini, and Mehdi Khaki. Spatio-temporal road accident registration and hazardous location identification (in Persian). *Geospatial Engineering Journal*, 2(1):35–, 2011. ISSN 2228-5628.

Farid Cheraghi, Mahmoud Reza Delavar, Farshad Amiraslani, and Seyed Kazem Alavipanah. Movement mining of animals' behavior and interaction: Asiatic cheetah and Persian leopard in Bafq protected area (in Persian). *Journal of Environmental Studies*, 44(2):331–344, 2018b. ISSN 1025-8620. URL http://doi.org/10.22059/jes.2018.257902.1007663.

Farid Cheraghi. *Movement Mining Using Ambient Intelligence (in Persian).* PhD thesis, University of Tehran, 2018b. URL https://ganj.irandoc.ac.ir/#/articles/0575b0e8b387b735e2501a92a4fda987.

Eliezer Gurarie and Farid Cheraghi. *smoove: Simulation and Estimation of Correlated Velocity Movement (CVM) Models*, 2019. URL https://github.com/EliGurarie/smoove. R package version 0.1-0.

Farid Cheraghi, Farshad Hakimpour, Abbas Abedini, and Jamshid Maleki. Temporal routing by transportation vehicles trajectory in moving objects database (in Persian). *Geospatial Engineering Journal*, 3(1):9–, 2012. ISSN 2228-5628.

Farid Cheraghi. An evaluation of moving object databases (in Persian). Master's thesis, University of Tehran, 2011. URL http://dx.doi.org/10.13140/RG.2.2.30227.78881.

Farid Cheraghi, Mahmoud Reza Delavar, Farshad Amiraslani, and Kazem Alavipanah. Asiatic cheetah behavioral estimation from telemetry data using bayesian statistics. In *Imaging and Geospatial Technology Forum IGTF 2017 ASPRS Conference Proceedings*, Baltimore, Maryland, USA, July 2017. American Society for Photogrammetry and Remote Sensing (ASPRS).

Jamshid Maleki, Farshad Hakimpour, Gholamreza Fallahi, and Faridedin Cheraghi. Framework for composition and execution of OGC web services (in persian). *Geospatial Engineering Journal*, 2(4): 1–, 2011. ISSN 2228-5628.

## Students

The list follows student name, student level, my role, start date, end date and topic pattern ordered by recency:

- Ali Sadeghian, Msc in GIS, co-supervisor, 1403/04/1, cont., land administration and cadastre
- Erfan Hoseini, Bsc in Geomatics, mentor, 1402/07/1, cont., spatial database systems
- Mahsa Abazari, Bsc in Geomatics, mentor, 1402/07/1, cont., cadastre
- Seyed Hossein Jamalzadeh, Bsc in Geomatics, mentor, 1402/07/1, cont., free and open-source software for GIS
- Hossein Ghiasvand Nanji, PhD in GIS, co-supervisor, 1401/12/1, cont., computational landscape archaeology

## Teaching

- Spring 2023 & 2024, Spatial Data Analysis for graduate students in GIS engineering, University of Isfahan, Iran
- Fall 2022 & 2023, The Design and Implementation of Enterprise GIS for graduate students in GIS engineering, University of Isfahan, Iran
- Fall 2022, Spring 2023 & Spring 2024, Geospatial Information Systems (GIS) lab for undergrad students in Geomatics engineering, University of Isfahan, Iran
- Fall 2022, Spring 2023 & Spring 2024, Geospatial Information Systems (GIS) for undergrad students in Geomatics engineering, University of Isfahan, Iran
- Spring 2022, Cadastre II for undergrad students in Geomatics engineering, University of Isfahan, Iran
- Spring 2022, Apartment subdivision workshop for undergrad students in Geomatics engineering, University of Isfahan, Iran
- Fall 2019, Introductory R workshop instructor for MSc and PhD students in GIS, University of Tehran, Iran

- Spring 2019, Temporal GIS for PhD students in GIS, University of Tehran, Iran
- Fall 2018, Computational geometry for MSc students in GIS, University of Tehran, Iran
- Fall 2018, Introductory R workshop instructor for MSc and PhD students in GIS, University of Tehran, Iran
- Spring 2018, Advanced Remote Sensing for Environmental Analyses Instructor, College of Environment, Karaj, Iran
- Fall 2017, Digital Terrain Modeling (DTM) Teaching Assistant, University of Tehran, Iran
- Spring 2017, Advanced R Programming Guest Lecturer, University of Maryland, USA
- Summer 2011, Oracle Spatial Instructor, National Geographic Organization, Iran
- Spring 2011, Oracle Spatial Instructor, Tehran Municipality Information and Computer Technology Organization, Iran
- Fall 2010, LiDar 3D Point Cloud Processing Teaching Assistant, University of Tehran, Iran

## Work Experience

Each item follows the "date, role, place: description" pattern.

- Oct2022-Now, Assistant professor of GIS, university of Isfahan
- Mar2018-Oct2022, President and geospatial data scientist, Asan Rahyab Aria (ASRA) Co Ltd: The overarching goal of our recent project with Deed and Properties Registration Organization (DPRO) is to enable surveying engineers to digitize, map, and process their drawings with free software as quick and painless as possible. They would digitize the plan of a surveyed building using a QGIS customized project, deploy our set of Bash, R, and Python scripts to plot their maps and output a cadastral textual document (through TEX) illustrating the apartment unit spatial divisions and their areas as well as boundary types and their dimensions. They would also export their drawings to a few other customized deliverable formats for DPRO and Tehran Municipality Organization (TMO). The set of open standards involved in this project are OGC Geopackage encoding and extensions, OGC simple feature (SF) common architecture and SQL option, OGC styled layer descriptor (SLD), Autodesk Drawing eXchange Format (DXF), ISO SQL multimedia and application part 3 (spatial) and ISO topology geometry (Topo-Geom) specifications. In addition, the project requires a deep engagement with the OGR abstract vector data model, OGR Geopackage and DXF drivers, and OGR feature style specification. It also gets a lot of mileage from the GEOS implementation of Dimensionality Extended nine-intersection Model (DE-9IM) and computational geometry (CG) algorithms like line-work polygonization and linestring merging.
- May2013-Sep2016, Jul2017-Now, Chartered surveying engineer, Tehran Construction Engineering Organization (TCEO): Surveying engineers who are qualified by and are a member of TCEO meter newly built multistory apartment buildings, so a real estate owner could obtain their deed from Deeds and Properties Registration Organization (DPRO). They use laser distance meters to measure the dimensions and angles of a land parcel and the boundary of the internal spaces on every floor of the building. They then draw and digitize their measurements in AutoCAD; they annotate it with the dimensions of the lines, the labels and areas of the spaces, and adorn it with a scale bar and a north arrow. Ultimately, they process the drawings with a customized cadastral software to create a textual document that defines the exact areas of each residential/commercial apartment unit, type of its boundaries and its neighboring spaces; this document accompanies the real estate's deed and it is used to calculate the monetary value of an apartment. The eventual goal of the DPRO is to build a 3 dimensional cadastral database of the whole country of Iran through the TCEO surveying engineers.
- May2017-Jul2017, I consolidated and updated biology related math exercises for two undergraduate courses, Math130 and Math131 for Biological Sciences Program at Department of Biology, University of Maryland College Park

- Jan2017-May2017, My work involved reviewing over 40 online (Mathbench) modules to check for mathematical or statistical errors, and inaccurate text. I also contributed to the new content towards the completion of a module on invasion biology at Department of Biology, University of Maryland College Park

- Mar2014-Sep2016, President, ASRA Co Ltd: Beside doing management tasks, I helped and coordinated a team of software engineers to build a custom desktop GIS application using ESRI ArcObjects C#.NET SDK for electricity, water and gas distribution companies. I personally extended ArcMap capabilities using ArcObjects C#.NET SDK in several pursuits: I developed several specialized network tracers for electricity (e.g. feeder analysis ), gas and water (e.g. valve isolation analysis) utility networks as an ArcMap add-in and exposed them as ArcGIS server "server object extensions (SOE)" and RESTful services. I deployed "ArcObjects Editor and Geodatabase extensions" to write a number of automatic attribute updaters and a few tailored geometrical construction tools. I also programmed a tool to export the entire electric utility network stored in a geodatabase to the DIgSILENT proprietary software format (.dgs) and also the Cyme software format (ASCII). Moreover, I developed an ArcMap add-in that displays Google street maps and satellite images as a WMTS layer in ArcMap; It also supports geocoding and reverse geocoding of a given address based on Google Geocoder API through a streamlined GUI. Ultimately, I coded a streamlined graphical user interface for easy user and group management with the options to create, edit, remove and grant access levels (read, insert, delete and update) to the users and groups in an ArcSDE PostgreSQL database; Additionally, I automated my workflows by writing shell scripts to make hot backups, weekly base backups, daily incremental backups and auto-compression of backup files.

- Apr2012-Mar2014, Smallworld GIS (Magik/C) programmer, Rassam Co Ltd: I provided support and services to the customers and developed software modules on top of GE Smallworld GIS application suite using C and Magik programming languages. For example, I wrote a native Smallworld GIS Shapefile exporter using shapelib and Smallworld TICS C libraries. In another project, I wrote a patch to enable Unicode support for Smallworld GIS Oracle InSync module in C and Magik language.

- Nov2010-Mar2012, Oracle Spatial (PLSQL/SQL/Javascript) Programmer, NRS Co Ltd: Working with large spatial tables with over 1 million parcels of a mega city (Tehran) is a challenge even with the best database in the world. My primary role was to develop and tune highly optimized spatial queries and to store them as PLSQL functions and procedures so as to a C#.NET software developer could call them from the application layer. To write blazing fast optimized spatial queries, I had to take advantage of Oracle advanced features such as a table partitioning, parallel query processing, and spatial data clustering. I exposed these functions as WMS, WFS-T and WMTS OGC map services. I leveraged Oracle Mapviewer Javascript API as the web mapping framework due to its performance and scalability. I rendered base maps (tile layers) and themes (e.g. identifiable feature layers), added a table of contents (TOC) to the web page, enabled feature identification of some themes, exported current map extent to a raster format, enabled creation and update of features with red-lining by a user, enabled searching of features based on their attributes and secured spatial objects access according to the users' roles.

- Nov2009-Nov2010, 3D point-cloud data collection and processing using RIEGL terrestrial laser scanner (LiDAR), Omran Asre Sepid (OAS) Co Ltd: I performed field laser scanning of archaeological and industrial pipeline sites using RIEGL Z420i laser scanner in various projects. I used RIEGL companion software RiScan Pro to collect and process the point-cloud data: I filtered out redundant and noisy data manually by delineating and deleting unwanted points and automatically by applying various filters (like Octree); I colored the point-cloud using color-images; I registered several scan-positions by performing bundle adjustment to transform the local coordinate system (LCS) to the project coordinate system (PRCS) using overlapping tie points to make up a complete scene; I georeferenced the scene by transforming PRCS to global coordinate system (GLCS) using ground control points positioned accurately with a high-precision GPS receiver; I created a smooth surface by 3D triangulation of the point-cloud and also colored the surface to create a fully colored georeferenced 3D model of the object of interest, that is, to be positioned accurately on a global map with a universal projected coordinate system e.g. UTM. Several other by-products included ortho-rectified colored image, contour maps and fined cross sections of particular objects.

## Certification

- Sep2016, R Programming by Prof. Roger Peng at Johns Hopkins University on Coursera, an online non-credit course
- Aug2016, Statistical Learning by Prof. Trevor Hastie at Stanford University on Stanford Online, an online non-credit course
- Apr2016, Machine Learning by Prof. Andrew NG at Stanford University on Coursera, an online non-credit course
- Mar2014, ArcGIS Desktop Developer Associate 10.1. This was an in-person proctored examination and the certificate could be verified by searching my name at the ESRI directory service website.

## Code

- CACPL author, 2017-07, Conservation of Asiatic Cheetah and Persian Leopard, R scripts to reproduce the results of my PhD thesis research and the corresponding papers,
- ML-Course author, 2016-04, R version of the programming exercises' of Prof. Andrew NG machine learning (ML) Coursera course, with the option to directly submit the solutions to Coursera website (stars $>$ 160),
- smoove contributor, 2017-05, Simulation and Estimation of Correlated Velocity Movement (CVM) Models
- marcher contributor, 2017-04, Migration and Range Change Estimation in R, R package contributer
- Author of miscelaneous modules and extensions for ArcGIS, Smallworld GIS, Oracle and QGIS in C#, Python, Magik, C++, and R

## Computer Skills

**Free software toolbox:** Arch Linux, Bash, R, Python, C/C++, git

**DBMS** : Postgresql, SQLite, etc.

**Writing:** LaTeX2e, LibreOffice, markdown, etc.

**Text Editor:** Vim

**Geospatial:** QGIS, GRASS, QCAD, etc.

**Proprietary software toolbox:** MS Windows, C#.NET, ESRI ArcGIS, ArcObjects, MATLAB, Oracle DBMS, GE Smallword GIS, AutoCAD, MS Office, etc.

## Voluntary Experience

GIS StackExchange (reputation $>$ 8.5k)

## Language

- English (proficient): TOEFL iBT (Oct 22, 2011) Overall: 84/120
- Persian (native)