

ORIS AWARD

ORIGINAL RESEARCH IN SCIENCE

PART A: To be filled in by the student

The student is **required** to e-mail this form to the supervisor after he has filled in PART A of the form.

Student's Name	Efe Ali Görgüner
Supervisor's Name & Position	Prof. Ginestra Bianconi, Professor of Applied Mathematics
Supervisor's e-mail	g.bianconi@qmul.ac.uk
Name and address of research institution	Queen Mary University London
Dates when project was carried out at the institution	11.08.2022-05.09.2022
Duration of placement (number of weeks)	3
Title of project	The Robustness and Predictability of Networks

PART B: To be filled in by the supervisor after the placement

REPORT ON STUDENT (Page 2)

Please write a report on the performance of the student in the placement. Please comment on their commitment, enthusiasm, level of independence, quality of scientific work carried out, academic ability and their potential for future scientific studies.

Your comments will be invaluable to the student's university applications.

Thank you very much for supervising the student and for writing this report.

REPORT ON STUDENT:

It is with great pleasure that I write about Efe Görgüner work conducted during 3 weeks in the August 2022 under my supervision.

Efe is the first K-12 student I ever supervised, and I have to admit that at the beginning I was not sure of what research question could be a good fit for the ORIS project. In the first meeting with Efe I propose him some “safe” projects such as the analysis of a network with centrality measures, however I soon realized that Efe was way more ambitious, so I proposed to him the study of percolation. I sent to Efe some lecture notes I had written for a third year module on Complex Networks and I put Efe in contact with my third year PhD student Hanlin Sun that is conducting his thesis on generalized percolation problems. I made sure Efe could start working on percolation with some simple Python code.

After few weeks, the result was amazing. Efe project is at the level of top BSc third year projects. Efe produced a large variety of work, and figures, studying numerically finite-size of the percolation transition, and realizing that stochastic effects are suppressed if the network size is larger. He investigated the model on Erdos and Renyi as well as on the Barabasi Albert model and on real network datasets. This progress was really impressive, Efe produced much more code and demonstrated a very strong critical thinking and ability to greatly expand the subject of his research project in very short time.

However, Efe did not stop there: at his own initiative he studied also cascades in networks models and simulated such a process successfully demonstrating the power-law distribution of avalanche sizes in a mean-field model. Finally he ventured into addressing some of its own research questions by studying Boolean networks and the perceptron model finding very good results, despite he did not had any guidance from us on these models.

The resulting project is an excellent work surely at the level of top BSc third year projects.

Simply put, Efe is an exceptional student with impressive potential to become a scientist. Efe has exceptional capabilities in addition to the interest, motivation, and the passion to enjoy research which makes him a very promising young researcher. I believe he deserved to attend UK top universities for his brilliance and enormous potential.

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Signature of supervisor:

Not necessary if returning form from an official e-mail address

Ginestra Bianconi

Please e-mail the completed form directly to wsl@rgsg.co.uk

(Mr W S Lau, Head of Chemistry, Royal Grammar School, Guildford. GU1 3BB)