

# A Glance at R&T Assistant

BLG113E

Introduction to Computer Engineering and Ethics

**Presenter:** Elif Ak, *PhD Candidate,*  
*Teaching Assistant Representative*



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# Outline

1. Formal Definition of Assistant
2. Our TA Members
3. TA vs R&T Assistant
4. Some Hints
5. Conclusions

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# Formal Definition of Assistant

- A **research assistant** is a researcher employed, often on a temporary contract, by a [university](#) or a research institute, for the purpose of assisting in academic [research](#).

- cite for Wikipedia

- A **teaching assistant** or **teacher's aide (TA)** or education assistant (EA) is an individual who assists a [teacher](#) with instructional responsibilities.

- another cite for Wikipedia

# TA Responsibilities

- Attending lab. Sessions
  - Logic Circuits Lab.
  - Microcomputer Lab.
  - Data Structures Lab.
- Recitations
  - Analysis of Algorithms I & II
  - Discrete Mathematics
  - Formal Languages and Automata
  - Actually, most of the courses have recitations
- Evaluating assignments
  - Almost all of the courses have assignments and projects (Bad news! 😊)

# TA Responsibilities (*Full List*)

TA duties and responsibilities **MAY** include the following, *each course has own requirements*

- Conduct quiz section meetings
- Facilitate discussions
- Prepare lectures for quiz sections
- Prepare review materials for quiz sections
- Hold extra review sessions for exams
- Hold regular office hours
- Tutor students
- Manage and respond to course-related e-mail
- Prepare webpage for course materials
- Maintain (update) webpage for course materials
- Develop and maintain electronic bulletin boards, discussion sites, etc.
- Attend lectures
- Prepare assignments
- Grade assignments
- Prepare test questions
- Proctor exams
- Score exams
- Maintain grading records
- Maintain course attendance records
- Calculate quarter grades
- Attend instructor/TA meetings
- Attend TA Training seminar/courses
- Act as liaison/mediator between student and professor
- Prepare lecture materials
- Present lectures
- Prepare handout materials
- Review literature

# TA Responsibilities

Each semester, around **30 – 40 lectures** are given by the department.

- So, each assistant is required to `assist` **2 or 3 lectures** in a term.

DERS KODU /COURSE CODE :

| CRN   | Ders Kodu   | Ders Adı                       | Öğretim Üyesi            | Bina       |
|-------|-------------|--------------------------------|--------------------------|------------|
| CRN   | Course Code | Course Title                   | Instructor               | Building   |
| 11655 | BLG 111E    | Intr. to Computer Engineering  | Sema Fatma Oktuğ         | MED        |
| 12863 | BLG 212     | Mikroişlemci Sistemleri        | Tamer Ölmez              | EEB        |
| 11686 | BLG 212E    | Microprocessor Systems         | Gökhan İnce              | EEB        |
| 11687 | BLG 212E    | Microprocessor Systems         | Eşref Adalı              | EEB        |
| 11685 | BLG 212E    | Microprocessor Systems         | Burak Berk Üstündağ      | EEB        |
| 12868 | BLG 212E    | Microprocessor Systems         | Deniz Balkan             | EEB        |
| 11299 | BLG 231     | Sayısal Devreler               | Yücel Aydın              | EEB        |
| 11300 | BLG 231     | Sayısal Devreler               | Serhat İkizoğlu          | EEB        |
| 12870 | BLG 231     | Sayısal Devreler               | Ece Olcay Güneş          | EEB        |
| 12875 | BLG 231     | Sayısal Devreler               | --                       | EEB        |
| 11688 | BLG 231     | Sayısal Devreler               | --                       | EEB        |
| 11301 | BLG 231E    | Digital Circuits               | Siddika Berna Örs Yalçın | EEB        |
| 12876 | BLG 231E    | Digital Circuits               | Mustafa Altun            | EEB        |
| 11689 | BLG 231E    | Digital Circuits               | Feza Buzluca             | EEB        |
| 11690 | BLG 231E    | Digital Circuits               | Mustafa Ersel Kamaşak    | EEB        |
| 15871 | BLG 231E    | Digital Circuits               | Sanem Kabadayı           | EEB        |
| 11692 | BLG 233E    | Data Structures and Laboratory | Gülşen Eryiğit           | EEB<br>INB |

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# Our Web Sites

## One Faculty:

<https://bbf.itu.edu.tr/>

## 2 Departments:

BLG: <https://bm.itu.edu.tr/>

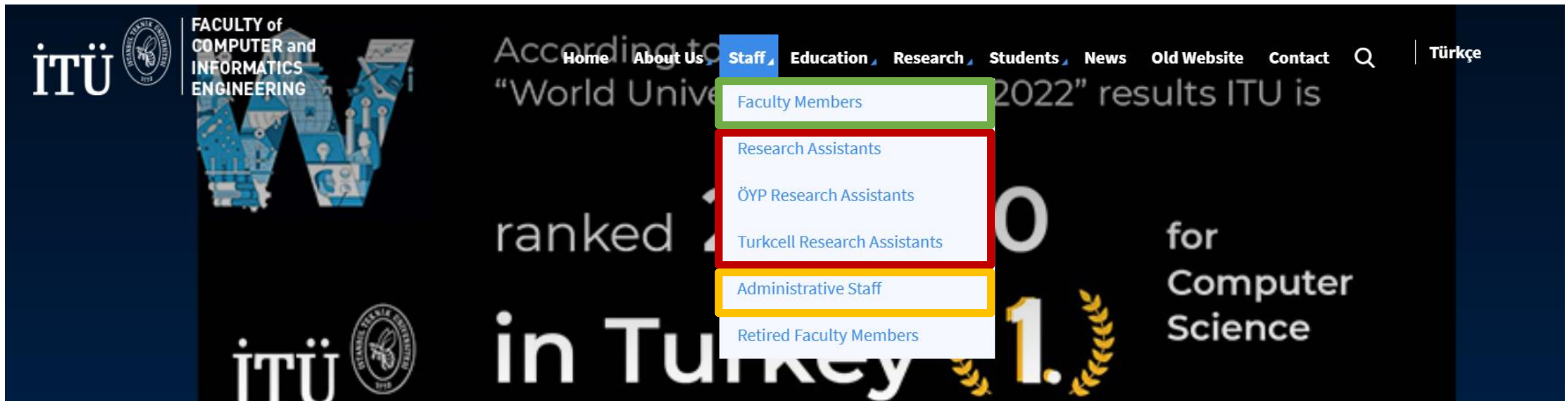
YZV: <https://yapayzeka.itu.edu.tr/>



# Our Web Sites

**One Faculty:**

<https://bbf.itu.edu.tr/>



# Our R&T Assistants (ITU-staffed)



**Arş. Gör.**  
Abdullah Akgül  
[E-Posta](#)



**Arş. Gör.**  
Abdullah Cihan Ak  
[Detaylı Profil](#)  
[E-Posta](#)



**Arş. Gör.**  
Abdullah Ekrem Okur  
[Detaylı Profil](#)  
[E-Posta](#)



**Arş. Gör.**  
Alperen Kantarcı  
[Detaylı Profil](#)  
[E-Posta](#)



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Talip Tolga Sarı  
[Detaylı Profil](#)  
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Tolga Ok  
[E-Posta](#)



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**Arş. Gör.**  
Muhammed Raşit Erol  
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Neşe Güneş  
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Sadık Uğursoy  
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Şeymanur Aktı  
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Tacettin Ayar  
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# Our R&T Assistants (ÖYP-staffed)



**Arş. Gör.  
(ÖYP)**

Beyza Eken

[Detaylı Profil](#)

[E-Posta](#)



**Arş. Gör.  
(ÖYP)**

Büşranur Bülbül

[Detaylı Profil](#)

[E-Posta](#)



**Arş. Gör.  
(ÖYP)**

Cumali Türkmenoğlu

[Detaylı Profil](#)

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**Arş. Gör.  
(ÖYP)**

Kıymet Kaya

[Detaylı Profil](#)

[E-Posta](#)



**Arş. Gör.  
(ÖYP)**

Mücahit Altıntaş

[E-Posta](#)



**Arş. Gör.  
(ÖYP)**

Nurullah Ateş

[Detaylı Profil](#)

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**Arş. Gör.  
(ÖYP)**

Uğur Ayvaz

[Detaylı Profil](#)

[E-Posta](#)



**Arş. Gör.  
(ÖYP)**

Yunus Emre Cebeci

[Detaylı Profil](#)

[E-Posta](#)

## Our R&T Assistants (Turkcell-staffed)



**Arş. Gör.  
(Turkcell Destekli)**  
Abdullah Sadık Satır  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Asel Menekşe  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Barış Bilen  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Burcu Kartal  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Esin Ece Aydın  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Evren Kanalıcı  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Gamze Akyol  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Mert Sülük  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Sultan Çoğay  
✉ E-Posta



**Arş. Gör.  
(Turkcell Destekli)**  
Ziya Ata Yazıcı  
✉ E-Posta

**Current Total: 45 + 6 Members**

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# TA vs R&T

## **TA: Teaching Assistant (or Graduate TA, GTA)**

- Preparing slides and course packages for courses
- Leading DS and PS sessions
- Holding office hours to answer students' questions, if necessary
- Keeping course records as required
- Grading short essays

## **RA: Researcher (just research, ultimate goal 😊)**

- Data collection
- Technical translation
- Data entry and data analysis
- Field work (e.g., excavation) or lab experiments/studies
- Literature review
- Editing scientific publications and preparing slides for scientific conferences

## **R&T: Research and Teaching Assistant (like ITU assistants)**



# Research

- Besides teaching, It is **mandatory** that every assistant must **do research**
- Assistants are also students as well (**MSc or PhD students**)

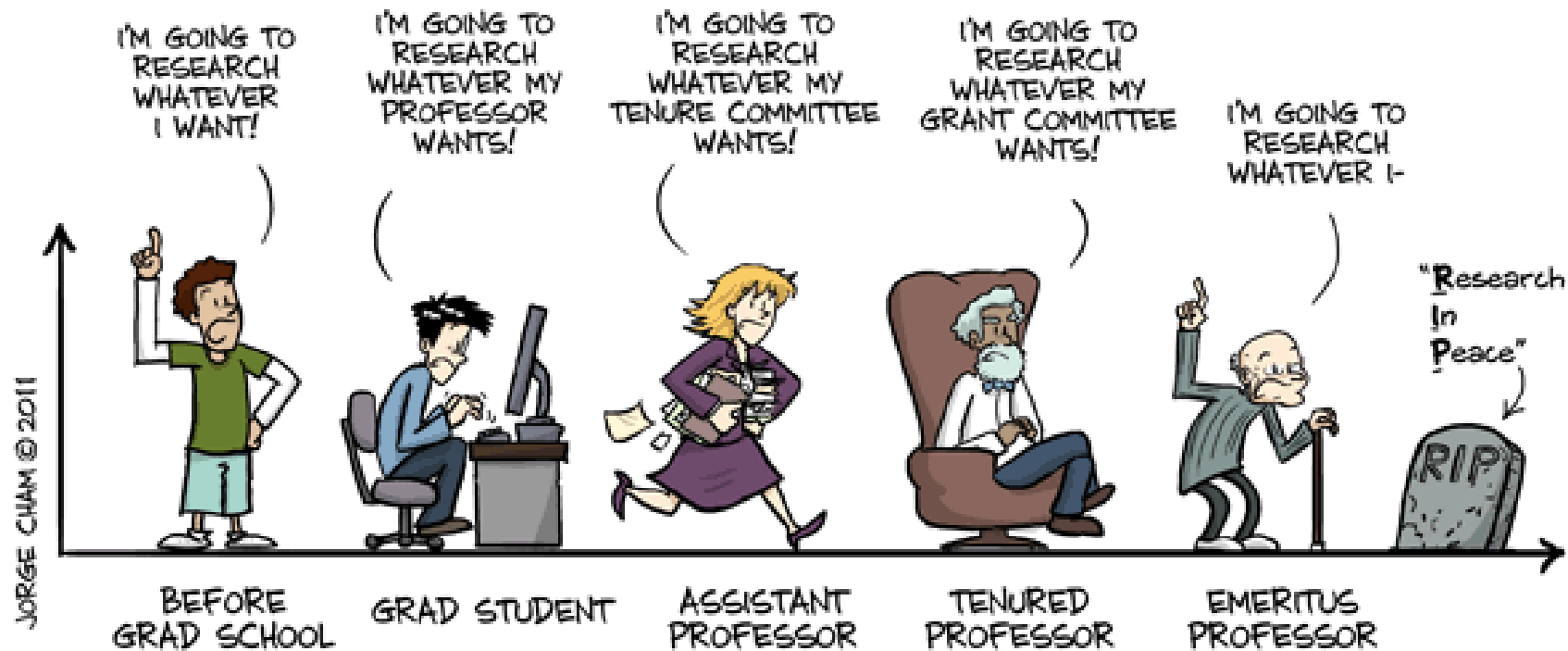




# Research

After PhD, continue doing research for the rest of your life ...

## THE EVOLUTION OF INTELLECTUAL FREEDOM



## Research

- Literature review
- Find problem
  - Research question!
- Find candidate methods
- Conduct experiments
- Design your proposed solution
- Write a paper
  - Conference
  - Journal
  - Magazine
  - Poster, etc.

Think  
outside  
the box



## Intelligent Sound Source Localization and Its Application to Multimodal Human Tracking

Keisuke Nakamura, Kazuhiro Nakadai, Futoshi Asano, and Gökhan Ince

COMMUNICATIONS SURVEYS & TUTORIALS, VOL. 13, NO. 3, THIRD QUARTER 2011

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## A Survey of Architectures and Localization Techniques for Underwater Acoustic Sensor Networks

Melike Erol-Kantarci, Hussein T. Mouftah, and Sema Oktug

**Abstract**—The widespread adoption of the Wireless Sensor Networks (WSNs) in various applications in the terrestrial environment and the rapid advancement of the WSN technology have motivated the development of Underwater Acoustic Sensor Networks (UASNs). UASNs and terrestrial WSNs have several common properties while there are several challenges particular to UASNs that are mostly due to acoustic communications, and inherent mobility. These challenges call for novel architectures and protocols to ensure successful operation of the UASN. Localization is one of the fundamental tasks for UASNs which is required for data tagging, node tracking, target detection, and it can be used for improving the performance of medium access and network protocols. Recently, various UASN architectures and a large number of localization techniques have been proposed. In this paper, we present a comprehensive survey of these architectures and localization methods. To familiarize the reader with the UASNs and localization concepts, we start our paper by providing background information on localization, state-of-the-art oceanographic systems, and the challenges of underwater communications. We then present our detailed survey, followed by a discussion on the performance of the localization techniques and open research issues.

**Index Terms**—Localization, underwater acoustic sensor networks

### I. INTRODUCTION

UASN technology provides new opportunities to explore the oceans, and consequently it improves our understanding of the environmental issues, such as the climate change, the life of ocean animals and the variations in the population of coral reefs. Additionally, UASNs can enhance the underwater warfare capabilities of the naval forces since they can be used for surveillance, submarine detection, mine countermeasure missions and unmanned operations in the enemy fields. Researchers from the Office of Naval Research (ONR) have recently emphasized that the US Navy has an increasing interest in UASN technology [1]. Furthermore, monitoring the oil rigs with UASNs can help taking preventive actions for the disasters such as the rig explosion that took place in the Gulf of Mexico in 2010. Last but not least, earthquake and tsunami forewarning systems can also benefit from the UASN technology.

Ocean monitoring systems have been used for the past several decades where these traditional oceanographic data

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S. Oktug is with Istanbul Technical University, Department of Computer Engineering, Maslak, Istanbul, Turkey (e-mail: sema.oktug@itu.edu.tr).  
Digital Object Identifier 10.1109/CSURV.2011.020211.000015

1553-877X/11/525-00 © 2011 IEEE

collection systems utilize individual and disconnected underwater equipments. Generally, these equipments collect data from their surroundings and send these data to an on-shore station or a vessel by means of satellite communications or underwater cables. In UASNs, these equipments are replaced by relatively small and less expensive underwater sensor nodes that house various sensors on board, e.g. salinity, temperature, pressure, current speed sensors. The underwater sensor nodes are networked unlike the traditional equipments, and they communicate underwater via acoustics.

In underwater, radio signals attenuate rapidly, hence they can only travel to short distances while optical signals scatter and cannot travel far in adverse conditions, as well [2]. On the other hand, acoustic signals attenuate less, and they are able to travel further distances than radio signals and optical signals. Consequently, acoustic communication emerges as a convenient choice for underwater communications. However it has several challenges. The bandwidth of the acoustic channel is low, hence the data rates are lower than they are in terrestrial WSNs. Data rates can be increased by using short range communications which means more sensor nodes will be required to attain a certain level of connectivity and coverage. In this case, the large-scale UASN bares additional challenges for communication and networking protocols. Moreover, the acoustic channel has low link quality [3] which is mostly due to the multi-path propagation and the time-variability of the medium. Furthermore, the speed of sound is slow (approximately 1500 m/s) yielding large propagation delay. In addition to those, in mobile UASNs, the relative motion of the transmitter or the receiver may create the Doppler effect. Besides these communication channel related challenges, UASNs are also energy limited similar to other WSNs.

Due to the above challenges, UASNs call for novel medium access, network, transport, localization, synchronization protocols and architectures some of which have been addressed in various studies [4]–[9]. The design of network and management protocols is closely related with the network architecture, and various UASN architectures have been proposed in the literature. Moreover, localization has been addressed widely since it is a fundamental task used in tagging the collected data, tracking underwater nodes, detecting the location of an underwater target and coordinating the motion of a group of nodes. Furthermore, location information can be used to optimize the medium access and the routing protocols.

In [10], the authors have surveyed several terrestrial localization methods and discussed their applicability for UASNs.

The second issue is caused by the equal localization of all sound sources without considering the type of each sound. In human tracking scenario, we should localize only humans, not their voices, but most studies regarded all sound sources as tracking targets. Due to the lack of selective functionality, audio-based human tracking methods have to rely on different information (e.g. vision) to eliminate non-target sound sources [5], [6]. To realize such human tracking audio alone, it is necessary to develop a framework for selective listening that depends on the type and/or importance of sound sources. To our knowledge, however, such an intelligent tracking system has not been proposed.

The third issue is essential for dealing with a real environment since audio tracking can track humans only during active periods. Visual human tracking can solve this problem. However, visual processing has difficulties in tracking while targets are out of the frame or overlap with other objects.

To solve these issues, this paper proposes an intelligent human tracking system based on multimodal integration, which can functionally and selectively track only the targets. For the first issue, we extended MUSIC [8] to utilize Generalized EigenValue Decomposition (GEVD), generating GEVD-MUSIC [7]. For this extension, we introduced a fully-configurable Correlation Matrix (CM) in addition to original CM of multi-channel signals. When the configurable CM is generated by a noise with high power, we can localize target sound sources with low power. This idea is further extended so dynamically changing the configurable results in the SSL of the target sound sources alone.

For the second issue, we introduced Sound Source Identification (SSI) to estimate the sound class ID of each source. We propose a hierarchical SSI based on *Oto-Ontology*. Since hierarchical architecture classifies sound sources roughly from top to bottom, it can provide at least enough classification result even for noisy/unknown sound sources. Human tracking can be achieved based on a selective listening function using SSI and GEVD-MUSIC.



For the third issue, we enhanced the robustness of tracking by the absence of voice activity or in the presence of noise by integrating sound tracking with vision based human tracking.

To address robustness in the real world, we introduce human head tracking based on the integration of a thermal and a distance camera. Finally, we integrated visual and audio tracking by applying a particle filter using weighted importance sampling.

The rest of the paper is organized as follows: Section II defines GEVD-MUSIC for the first issue. Section III de-

# Our Labs

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ranked 401-450

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Computer Networks

## Computer Networks Research Laboratory


Current research studies in Computer Networks Laboratory are mainly grouped under the following areas: Quality of Service issues in IP Networks, Optical Networks, Network & Data Security, Wireless & Ad-Hoc Networks and Traffic Engineering & Teletraffic.

Broadband Communication Research Group: <http://bcrg.itu.edu.tr/>


### Faculty Members Working in This Area:




**Prof. Dr.**  
Berk Canberk  
[Detailed Profile](#)  
[E-Mail](#)




**Prof. Dr.**  
Mehmet Keskinöz  
[Detailed Profile](#)  
[E-Mail](#)



**Prof. Dr.**  
Sema Fatma Oktuğ  
[Detailed Profile](#)  
[E-Mail](#)



**Asst. Prof. Dr.**  
Gökhan Seçinti  
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**Asst. Prof. Dr.**  
Mehmet Tahir Sandikkaya  
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# Faculty Map



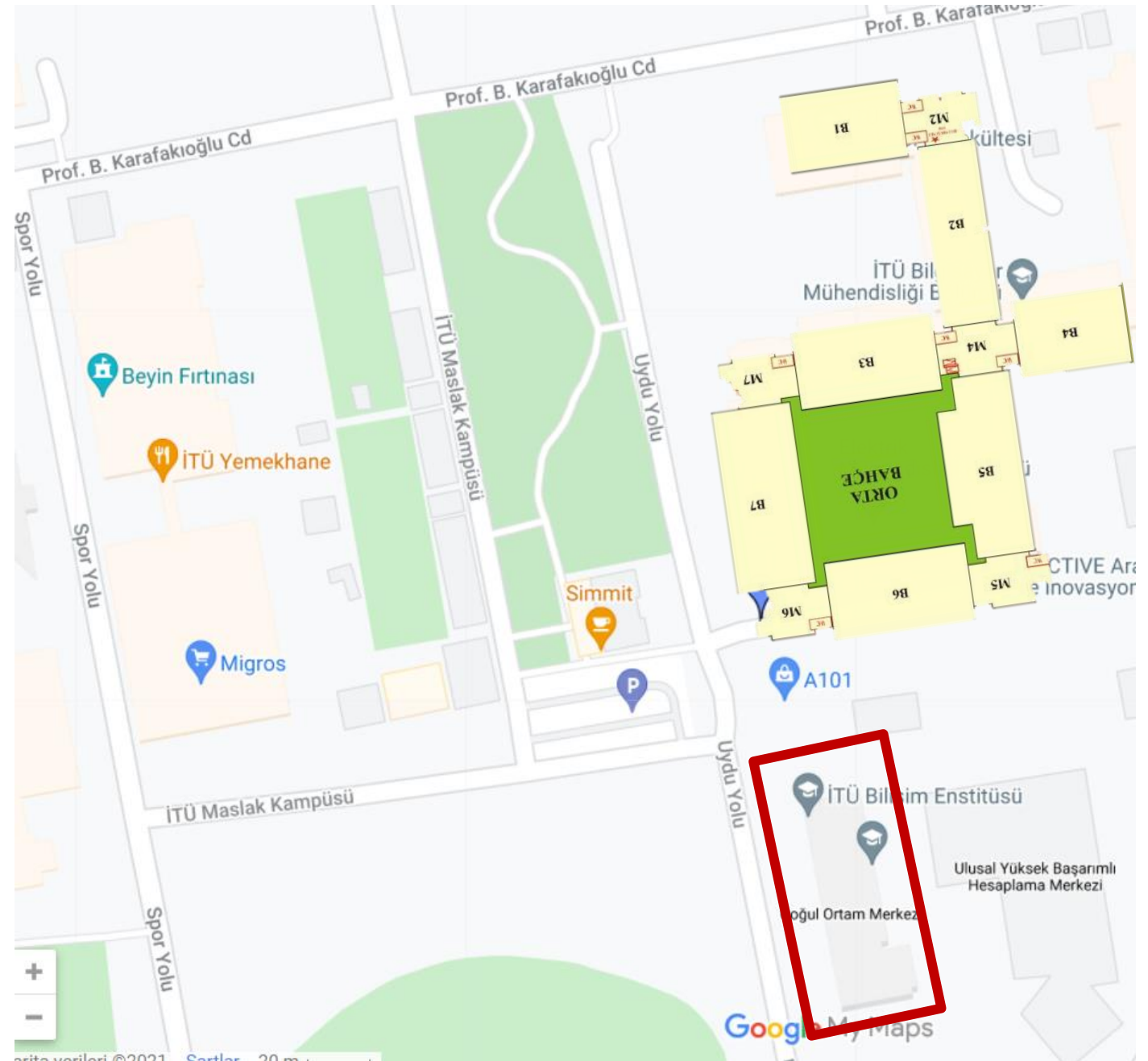
# Faculty Map





# Faculty Map

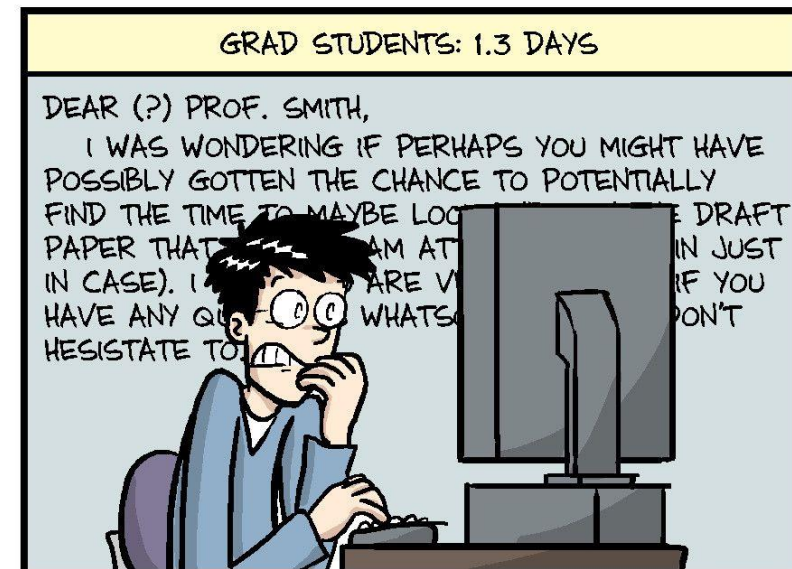
- ITU Information Institute
  - Floor 3<sup>rd</sup>
- 306-320



# Mails

- Please pay attention to your mails
- Use ITU formal Mail address
- SHOULD include
  - Your name
  - ITU number

## AVERAGE TIME SPENT COMPOSING ONE E-MAIL



# Mails

- Use ITU formal Mail address
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  - e.g. [akeli@itu.edu.tr](mailto:akeli@itu.edu.tr)
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- Do not forget to write appropriate **Subject**

webmail.itu.edu.tr/imp/dynamic.php?page=compose&type

Gönder Taslak Olarak Kaydet

Kimden: Elif Ak <akeli@itu.edu.tr> (Mail ID) ▼

Kime:

Kopya:

Gizli Kopya Ekle

Konu: About BLG113 HW1

: Dosya Ekle ▼

Dear ,

I am taking your class, BLGXXX .

Your Question, Problem or Request.

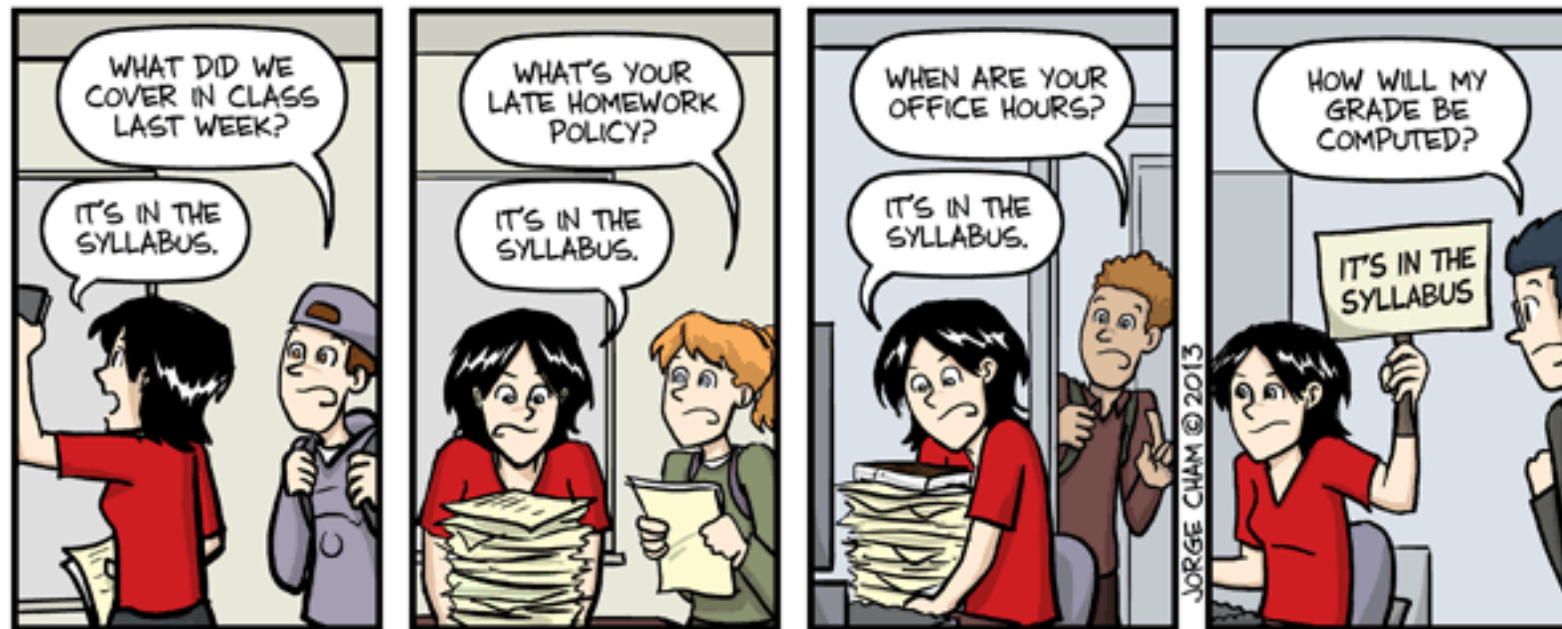
Regards, (or similar closing words)

YOUR FULL NAME,  
ITU NUMBER

İmza

# Syllabus

- Do NOT the forget to look Course Syllabus
- Continuously check Ninova updates



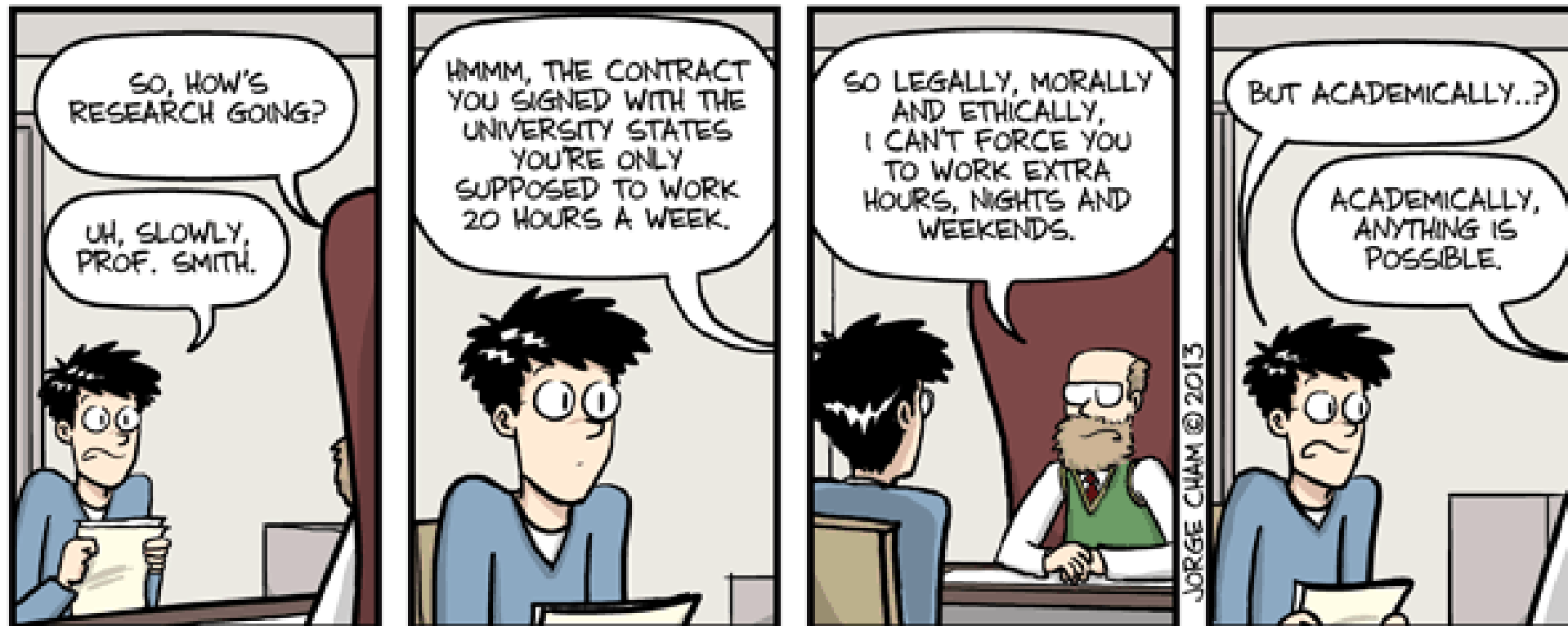
**IT'S IN THE SYLLABUS**

# HWs & Projects

- Do your homeworks!
  - Do them by yourself.
  - **Plagiarism** has serious consequences in our department.
- Do NOT hesitate to contact with the TAs!
  - Ask us questions.
- Check the MAIN books of the course
- Use Internet!

# Office Hours

- Follow office hours written at the Syllabus
- Ask for office hours by mail before coming





# Presentations

- Don't be afraid
- Try and fail



# THANKS

BLG113E

Introduction to Computer Engineering and Ethics

**Presenter:** Elif Ak, *PhD Candidate,*  
*Teaching Assistant Representative*



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