



METU-CENTER

MIDDLE EAST TECHNICAL UNIVERSITY CENTRAL RESEARCH
LABORATORY IN NANOTECHNOLOGY, NEW MATERIALS, NEW
PROCESSES AND BIOTECHNOLOGY

SPECIFIC SUPPORT ACTION

METU-CENTER Final Report

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Table of contents

PUBLISHABLE EXECUTIVE SUMMARY	2
Summary of tasks, activities and main conclusions	3
Task performed during first year of the project	4
Task performed during second year of the project	5
Task performed during third year of the project	6
 1 PROJECT OBJECTIVES AND MAJOR ACHIEVEMENTS DURING THE REPORTING PERIOD	
1.1 General objectives of the project	7
1.2 Objectives, work performed and main achievements of the reporting period	7
1.3 Problems encountered in the reporting period.....	10
 2 WORKPACKAGE ACHIEVEMENTS	
2.1 Achievements in WP1	11
2.2 Achievements in WP2	22
2.3 Achievements in WP3	34
2.4 Achievements in WP4	36
2.5 Achievements in WP5	39
 3 PROJECT MANAGEMENT	
3.1 Project management tasks, achievements and problems	41
3.2 Project Timetable and Status.....	42
3.3 Coordination activities	43

PUBLISHABLE EXECUTIVE SUMMARY

Contract no	SSA-017125	Reporting period:	Final
Title	MIDDLE EAST TECHNICAL UNIVERSITY CENTRAL RESEARCH LABORATORY IN NANOTECHNOLOGY, NEW MATERIALS, NEW PROCESSES AND BIOTECHNOLOGY		
Project Website	http://metucenter.metu.edu.tr or http://nnrc.metu.edu.tr		

Contractors

Contractor no.	Short Name	Contractor name	Country
1	METU	Middle East Technical University (Prof. Dr. Rasit Turan)	Turkey

Objectives:

The general aim of this project was to improve and strengthen the human and equipment resources of the Middle East Technical University Central Laboratory (METU-CL) in the area of **nanotechnology and nanosciences, knowledge based multifunctional materials, new production processes and devices (NMP), and molecular biology and biotechnology for food quality and safety**. This improvement is expected to raise the research capacity of the center to the level of leading research centers in Europe. As METU has been acting as a center and initiator of several national projects with many other universities in Turkey, this project will have an impact on the research capacity of the whole country through the nation-wide networks which are already established.

METU-CENTER project has been extremely useful in the following areas which were also formulated in the contract of the project.

1. Integration to other European centers was one of the objectives of the project. METU-CENTER project team has organized several activities to induce and enhance this integration. Among others, many big and small workshops, seminars, mutual expert visits, young student visits, joint project proposal preparation can be mentioned as the major activities for this purpose. It has also been possible for the METU-CENTER scientist to travel to Europe to present their scientific result at other conferences and workshops that took place in Europe. Details of these activities are given below and in the reports submitted to the Commission as deliverables. The major impact of all these activities METU has increased visibility of METU in Europe. METU is now the well known Turkish research institute across Europe.

2. At least 3 new successful FP7 project has been prepared through connections established by METU-CENTER project. Of these, two projects (NANOBIOSENS and CO-NANOMET) are at the negotiation phase.

3. METU-CENTER project has contributed to improve the research quality at METU through establishment of a new laboratory, and support provided to graduate students. Young researchers from METU has been able to visit other developed research centers to carry out some of their experiments and share and transfer experience. Many Ph.D. and M.Sc. thesis work have benefited from the support provided by the METU-CENTER project.

4. METU-CENTER has contributed to establish a new laboratory in which nanotechnology applications can be carried out. This laboratory consists of a clean room equipped with many types of equipments including an electron beam lithography system. Features with less than 50 nm can be fabricated in this new laboratory which is unique in Turkey and open to all researchers established in Turkey.

5. METU-CENTER project has established a network of people and laboratories working in the field of nanotechnology. Such a network has been experienced for the first time in Turkey.

METU-CENTER project has been implemented through 5 work packages listed below :

WP1 Dissemination of knowledge;

WP2 Human resource development: student and expert visits

WP3 Management of the project

WP4 Networking at national and international level

WP5 Upgrading the research infrastructure of the METU central laboratory

Most of the tasks described in these workpackages have been carried as planned in Annex I of the project contract. Deviations from the original plan are explained below. Tables below show a summary of the tasks completed during whole duration of the project.

SUMMARY OF TASKS, ACTIVITIES AND MAIN CONCLUSIONS

TASK PERFORMED DURING FIRST YEAR OF THE PROJECT

Work package no	Task/activity	Persons responsible	Results/Conclusions
WP1	<i>Organization of NANOMAT 2006 Workshop</i>	Prof. Dr. Macit Ozenbas Prof. Dr. Rasit Turan Prof. Dr. Murvet Volkan Prof. Dr. Gurkan Karakas	Preparation of Nanomat 2006 has been carried out successfully, 260 abstracts have been received until May 15, 2006.
WP1	<i>Organization of NANO-TRII 2006 Conference</i>	Prof. Dr. Macit Ozenbas Prof. Dr. Rasit Turan	The conference took place on 3-5 May, 2006 on METU Campus with participation of 581 registered participants.
WP1	<i>Conference participation</i>		METU Center members have participated in 25 conferences in Europe and elsewhere. 6 of these participations have been supported by the project resources partially or fully
WP2	<i>Organization of Seminar Series</i>	Prof. Dr. Cigdem Ercelebi	Various seminars and lecture series with participation from Europe have been organized by the project team
WP2	<i>Young researchers visits from METU-CENTER to European Research Centers</i>	Prof. Dr. Cigdem Ercelebi	3 Ph. D. students have been sent to European research centers for a stay of 1 month each
WP2	<i>Expert visits from European Research Centers to METU-CENTER</i>	Prof. Dr. Cigdem Ercelebi	5 experienced experts from leading research centers from Europe have been invited to METU. They have stayed about 1 week on METU campus and delivered lectures and seminars and participated in experiments.
WP3	<i>Project management</i>	Prof. Dr. Rasit Turan Prof. Dr. Macit Ozenbas Prof. Dr. Deniz Uner Prof. Dr. Murvet Volkan Prof. Dr. Gurkan Karakas	The project has been managed efficiently by means of a) General Assembly (GA) and b) Executive Committee (EC)
WP4	<i>Web page development</i>	Prof. Dr. Deniz Üner	METU-CENTER web page has been developed and uploaded on 15 August 2005 to the address “ http://www.metucenter.metu.edu.tr ” It has been extensively used for the organization of Nanomat 2006 workshop.
WP5	<i>Equipments</i>	Prof. Dr. Rasit Turan	1. E-beam lithography system has been purchased. It is being constructed now. 2. Micro array system has been purchased and installed. 3. A 95 m ² clean room has been constructed with additional resources provided by METU

TASK PERFORMED DURING SECOND YEAR OF THE PROJECT

WP No	Task/activity	Persons responsible	Results/Conclusions
WP 1	Organization of NANOMAT 2006 Workshop	Prof. Dr. Macit Ozenbas Prof. Dr. Rasit Turan Prof. Dr. Murvet Volkan Prof. Dr. Gurkan Karakas	The conference took place on 21-23 June, 2006 in Antalya with 53 oral contributions, 214 poster presentations and 223 participants.
WP1	Organization of NANOMAT 2007 Workshop	Prof. Dr. Meral Yücel Prof. Dr. Rasit Turan Prof. Dr. Hüseyin A. Öktem Prof. Dr. Ufuk Bakır	Preparation of Nanomat 2007 has been carried out successfully. Receiving abstracts.
WP 1	Organization of NCC-1 National Catalyses Conference1	Prof. Dr. Gurkan Karakas Prof. Dr. Deniz Üner	NCC-1 conference took place on 17-20 January 2007 at METU Northern Cyprus Campus.
WP 1	Organization of “First Anatolian School of Catalysis” Conference	Prof. Dr. Gurkan Karakas Prof. Dr. Deniz Üner	First Anatolian School on Catalysis consists of two workshops: Master Class Catalysis and Computational Catalysis. Workshops and lectures were held on 25.9-6.10 2006 at METU Ankara.
WP 1	Organization of NRF	Prof. Dr. Rasit Turan Prof. Dr. Macit Ozenbas	The forum took place on 16- 20 October 2006 on METU Campus with about 200 participants
WP 1	Organization of Nano-TR 2	Prof. Dr. Rasit Turan Prof. Dr. Macit Ozenbas	The conference took place on 3-5 May, 2006 on METU Campus with participation of 581 registered participants.
WP1	Conference participation		METU center members have participated in 17 conferences in Europe and elsewhere. 11 of these participations have been supported.
WP2	Organization of Seminar Series	Prof. Dr. Cigdem Ercelebi	Various seminars and lecture series with participation from Europe have been organized by the project team
WP2	Young researchers visits	Prof. Dr. Cigdem Ercelebi	5 Ph. D. students have been sent to European research centers for a stay of 1 month each
WP2	Expert visits from European Research Centers to METU-CENTER	Prof. Dr. Cigdem Ercelebi	31 experienced experts from leading research centers from Europe have been invited to METU. They have stayed about 1 week at METU campus and delivered lectures and seminars and participated in experiments.
WP3	Project management	Prof. Dr. Rasit Turan Prof. Dr. Macit Ozenbas Prof. Dr. Deniz Uner Prof. Dr. Meral Yücel Prof. Dr. Çiğdem Erçelebi	The project has been managed efficiently by means of a) General Assembly (GA) and b) Executive Committee (EC)
WP4	Web page development	Prof. Dr. Deniz Üner	It has been used for the organization of Nanomat 2006, Nanomat 2007 ans Nanomat 2008 workshops and other workshops organized by METU-CENTER. The associate membership procedure has been started in October 2006 The number of members is about 158 at this stage.
WP5	Equipments	Prof. Dr. Rasit Turan	1. Probe Station has been purchased and installed. 2. Clean room compatible Lab-Benches have been purchased. 3. E-beam lithography system has been installed. 4. Dry and wet oxidation ovens and probe station have been purchased and installed.

TASK PERFORMED DURING THIRD YEAR OF THE PROJECT

Work package no	Task/activity	Persons responsible	Results/Conclusions
WP1	<i>Organization of NANOMAT 2007 Workshop</i>	Prof. Dr. Meral Yücel Prof. Dr. Rasit Turan Prof. Dr. Hüseyin A. Öktem Prof. Dr. Ufuk Bakır Prof. Dr. Zümrüt Begüm Ögel	The conference took place on 31 October – 03 November, 2007 in Antalya with 53 oral contributions, 214 poster presentations and 223 participants.
WP1	<i>Organization of NANOMAT 2008 Workshop</i>	Prof. Dr. Abdelillah Slaoui Prof. Dr. Raşit Turan Prof. Dr. Çiğdem Ercelebi Prof. Dr. Macit Özenbaş Prof. Dr. Levent Toppare Seda Bilgi	Preparation of Nanomat2008 has been carried out successfully. The conference took place on 24 – 26 April 2008 in Ankara with 29 oral contributions , 35 poster presentations and 150 participants
WP1	<i>Organization of NCC-2 National Catalyses Conference1</i>	Prof. Dr. Gurkan Karakas Prof. Dr. Deniz Üner	NCC-2 conference took place on 17-20 January 2007 at METU Northern Cyprus Campus.
WP1	<i>Workshop on Solid State NMR Recent Developments</i>	Prof. Dr. Deniz Üner Dr. Burcu Akata Kurç Dr. Ayşe Eda Aksoy	Workshop was held on 30 October -1 November 2007 on METU campus-Ankara with about 90 participants, 4 invited speakers
WP1	<i>Conference participation</i>		METU Center members have participated in 14 conferences in Europe and elsewhere. 11 of these participations have been supported by the project resources partially or fully
WP2	<i>Organization of Seminar Series</i>	Prof. Dr. Cigdem Ercelebi	Various seminars and lecture series with participation from Europe have been organized by the project team
WP2	<i>Young researchers visits from METU-CENTER to European Research Centers</i>	Prof. Dr. Cigdem Ercelebi	5 Ph. D. students have been sent to European research centers for a stay of 1 month each
WP2	<i>Expert visits from European Research Centers to METU-CENTER</i>	Prof. Dr. Cigdem Ercelebi	31 experienced experts from leading research centers from Europe have been invited to METU. They have stayed about 1 week on METU campus and delivered lectures and seminars and participated in experiments.
WP3	<i>Project management</i>	Prof. Dr. Rasit Turan Prof. Dr. Macit Ozenbas, Prof. Dr. Deniz Uner Prof. Dr. Meral Yücel Prof. Dr. Çiğdem Ercelebi	The project has been managed efficiently by means of a) General Assembly (GA) and b) Executive Committee (EC)
WP4	<i>Web page development</i>	Prof. Dr. Deniz Üner	It has been extensively used for the organization of Nanomat2006, Nanomat 2007, Nanomat 2008 workshops and other workshops organized by METU-CENTER. The associate membership procedure has been started in October 2006 The number of members is about 158 at this stage.
WP5	<i>Equipments</i>	Prof. Dr. Rasit Turan	1. Additional Clean room compatible Lab-Benches have been purchased. 2. RTP (Rapid Thermal Processor) have been purchased and installed.

1 PROJECT OBJECTIVES AND MAJOR ACHIEVEMENTS DURING THE REPORTING PERIOD

1.1 General objectives of the project

The primary objective of this project was to improve the research capacity of Middle East Technical University Central Laboratory (METU-CL) towards forming a center of synergy in the area of **nanotechnology and nanosciences, knowledge based multifunctional materials, new production processes and devices (NMP), and molecular biology and biotechnology for food quality and safety**. With this improvement it was aimed that METU-CL will be a competitive research center integrated to the other centers of excellence in Europe through collaboration activities and networks set up during the project. Participation of METU-CL to FP7 and other European programs was expected to be enhanced. At the end of three years of the project, METU-CL will be a meeting, working and communication center for the scientists from Turkey and EU.

1.2 Objectives, work performed and main achievements of the reporting period

1.2.1. Objectives

Short description of the major objectives and tasks connected to these objectives are listed below.

National and international networks in the two thematic areas of the EU Framework program (NMP and Biotechnology for Food Quality and Safety) will be established. One of the aims of this project was to connect national networks already established by METU to its counterparts in EU in the field of thematic areas NMP and food quality and safety of the FP6.

Researcher and expert visits. Experienced scientists and experts from METU-CL visit European centers of excellence as specified in the work packages. These visits was planned to be short time visits (1 week to 3 months) for the purpose of training and preparation of cooperative activities such as the initiation of new project proposals.

M. Sc., Ph.D. students and Post. Doc.s was planned to be sent to European excellence centers to carry out some of the experiments necessary for their graduate studies, and/or to learn new techniques, and/or to train about a new instrument.

Workshops with national and international participation. The aim was to diffuse the research results, to disseminate the information about FP6/FP7 program and to initiate future European project proposals. 3 thematic workshops will be organized in three years.

25 Ph.D./M.Sc. studies on nanotechnology, biotechnology and on advanced material characterization and production techniques such as ESCA, Solid and Liquid State NMR Spectroscopy, FTIR Spectroscopy, Mass Spectroscopy, Electron Microscopy, Thermal Analysis

Techniques, nanolithography for the production of nanostructures, material processing for the production of nanostructures was planned to be supported through the project .

Around 25 joint research publications in the international SCI journals and 25 conference presentations in regularly held conferences in the NMP and molecular biology and biotechnology will be generated with the support of this project.

Upgrading the equipment park of METU-CL. The aim was to improve the METU-CL capability in the material processing and characterisation. A scanning electron microscope with lithography attachments was planned to be set up in a clean environment for nanotechnology studies. These systems are expected to serve all scientists from METU-CL and from other laboratories in Turkey. Another instruments to be purchased was a cDNA and protein micro array system with printing.

Working research groups connected to METU-CENTER project

Working research group	Contact person	Research Activity
Semiconductor Nanostructures for nanoelectronics and nanophotonics	Prof. Dr. Rasit Turan	Semiconductor nanocrystals and their applications to nanophotonics and nanoelectronics.
Magnetic nanoparticles	Prof. Dr. Macit Özenbas	Formation and characterisation of maghemite nano composites for applications such as magnetic recording, magnetic refrigeration.
Heterogeneous Catalysis	Prof. Dr. Gurkan Karakas	Synthesis and characterization of new catalytic materials tailored at nanometer scale including mesoporous structures for green chemistry.
Biotechnology for food quality and safety	Prof. Dr. Meral Yücel	DNA studies, large scale purification characterization, sequencing of proteins, Enzyme activity determinations and animal and plant tissue culture studies.

1.2.2 Main achievements

Main achievements and progress in the second 12 months of the project are described in sections under the title of workpackage progress below. A short summary of the main results and conclusions is also given in the task-achievement table above. A general and brief description will be given in this section for the sake of completeness.

Workpackage 1 aims at the dissemination of scientific and technological knowledge in order to diffuse and exploit research results and initiate new cooperative actions in FP7 through these workshops. These objectives have been reached through enhanced participation in workshops organized by METU-CENTER, European Commission and other organizations in Europe. Three such workshops were proposed in the technical annex of the project.

First workshop, with the name of Nanomat 2006 took place in Antalya, on June 21-23, 2006. METU-CENTER team organized this meeting successfully. There were 108 abstracts from Turkey, and 186 from other countries, totally 276 abstracts submitted through web page. 16 lecturers were invited from worldwide. The papers presented at this workshop have been reviewed and published at Journal of Nanoscience and Technology, at the beginning of 2008. Three METU-CENTER scientists (Prof. Rasit Turan, Prof. Macit Ozenbas, and Prof. Dr. Gürkan Karakas) worked as the editors of this publication. Prof. Ozenbas has been appointed as the permanent editor of this prestigious journal after this successful operation.

Second workshop, NANOMAT2007: International Workshop on Nanobiotechnology & Genome Technologies, took place on October 31- November 3, 2007 in Antalya-Turkey. The workshop has covered microarrays technologies, applications in agriculture food and safety, nanobiosensors, nanodelivery systems for drugs and genes. (please see the attached document). Organization committee members were Prof. Dr. Meral YÜCEL, Prof. Dr. Rasit TURAN, Prof. Dr. Hüseyin Avni ÖKTEM, Prof. Dr. Ufuk BAKIR, and Prof. Dr. Zümrüt Begüm ÖGEL.

Third workshop, NANOMAT2008: International Workshop on Advanced Materials for Photovoltaic Applications, took place on April 23-25, 2008 on METU campus in Ankara-Turkey. The workshop has covered major material and device technologies for photovoltaic applications. Organization committee members were Prof. Dr. M Erçelebi, Prof. Dr. Rasit TURAN, Prof. Dr. Macit Özenbaş, Prof. Dr. Levent Toppare, and Prof. Dr. Abdellillah Slaoui. The workshop has been organized successfully with 242 participants. An abstract book with 54 presentation has been published.

METU-CENTER has participated several international conferences/workshops in period covered this report. Detailed list is given in the description of the progress in workpackage 1.

Workpackage 2 aims at improving the human resources of METU-CENTER. Young scientists and experts of the working research groups will be trained with short term visits to leading research centers in Europe and visits of experts and scientists from European centers to METU-CL. Several experts visit from European research centers and visits from METU to European centers have been organized in this period. These visits have certainly contributed to the

improvement of the human potential of METU and also to the initiation of new cooperative actions in the near future. Young researchers sent to European research centers have gained experience and knowledge in carrying out their research work connected to their Ph.D. and M.Sc. studies.

Workpackage 3: The objective of this work package was to create efficient organization and management procedures for the success of the project. Management of the METU-CENTER project is being carried out through two organs: General Assembly (GA) and Executive Committee (EC). GA is composed of all members of the METU-CENTER project team. EC has members elected from the GA members. EC been holding regular meeting every month and when necessary to discuss the issues on its agenda. GA of the METU-CENTER has met 2 times during the second year of the project. There has been no significant problem in the management of the project.

Workpackage 4 deals with networking between scientists of METU-CL and other international research institutes to help creation of synergy for cooperative activities between them. One of the major tasks has been development of a web site for the METU-CENTER project. The web site was set up at the end of three months after the start of the project. This web site has been effectively used to diffuse information about the workshop the project team is organizing. Two major workshops have been organized through the web site in this period. The number of associate members is 160 at this stage. The associated members have been participated in workshop activities actively in this period.

Workpackage 5: The objective of this work package was to improve the research infrastructure of METU Central Laboratory in the material preparation and processing. METU-CL has been upgraded with the instruments. All purchased instruments have been installed. Research results in the research fields mentioned in the objectives have been generated by using instruments purchased through this project. The studies within the scope of workpackage have been completed successfully.

1.3 Problems encountered in the reporting period

Even though the project activities are being carried out successfully as planned in the technical annex, the following problems have been encountered. The main problems encountered in the second reporting period are listed below:

- Implementation of the visit program between METU and European Centers has been slightly behind the plan given in Annex I. Some improvements have been achieved in the third period, but the number of visits has been less than the targetted values. The main reason for this was lack of connections with people who can travel and stay abroad.
- A network has been set up among Turkish scientist working in the field of nanotechnology. Although this network is a success from the project's contractual obligation point of view, the idea was to reach a new national organization (a society or foundation etc.) in this field. However, this aim could not be reached until the end of the project, partly due to the lack of funding.

2 WORKPACKAGE FINAL ACHIEVEMENTS

Details of the progress made in different work packages are presented in the following subsections.

2.1 Achievements in WP1.

2.1.1 Workpackage Objectives

The objectives of this work package were two fold: the dissemination of scientific and technological knowledge in order to diffuse and exploit research results and initiate new cooperative actions in FP7 through these workshops. These objectives were to be reached through enhanced participation in workshops organized by METU-CENTER, European Commission and other organizations in Europe.

2.1.2 Tasks carried out and achievements:

Task 1: Organization of workshops by METU-CENTER

a) NANOMAT2006: International Workshop on Nanostructured Materials, June 21-23 Antalya-Turkey.

The Workshop on Nanostructured Materials was held on June 21-23, 2006 in Antalya-Turkey with 223 participation from Europe and rest of the world.. The workshop was an international workshop emphasizing on semiconductor nanostructures, magnetic nanoparticles and catalysts (please see the attached document). Details regarding the scope, list of invited speakers etc. can be seen at the conference website (www.metucenter.metu.edu.tr/nano2006/). Conference proceedings have been published in Journal of Nanoscience and Nanotechnology with about 120 original scientific papers. Some financial support has been provided for the participants from Eastern European and EU-Candidate Countries including Turkey.

Preparation work has been carried out by the organization committee since September 2005. The committee members were selected from the members of the METU-CENTER project team. The organization committee is composed of these scientists: Prof. Dr. Rasit Turan, Prof. Dr. Macit Ozenbas, Prof. Dr. Murvet Volkan, and Prof. Dr. Gurkan Karakas. The organization committee has been holding meetings regularly for the preparation. Among others, following activities have been carried out : A conference web page has been set up in connection with the main METU-CENTER web page; a workshop poster and flyer have been designed, printed and distributed across Europe; an e-mail distribution list has been set up for efficient communication with the potential participants and several announcements have been distributed to this e-mail list; necessary arrangements for workshop venue has been arranged with a travel agent; workshop program has been studied and determined. Details of Nanomat2006 are given in Deliverable 1.1.

b) Nanoscience and Nanotechnology Conference 2006 (NanoTRII)

NanoTRII was the second national conference on nanoscience and nanotechnology which has been organized at METU campus on May 3-5, 2006. The number of registered participants has

been 581 which is record high for a national conference in the field of natural sciences. 8 invited lecturers from Europe and US participated in the NanoTR II meeting. Two of the four members of the conference organization committee were from the METU-CENTER team. METU-CENTER project has been cited and explained in various talks given by METU-CENTER team including the project coordinator Prof. Dr. Rasit Turan who gave an invited talk at the conference. List of lecturers is given in Appendix II.

c) A workshop on Modern Electron Paramagnetic Resonance Spectroscopy

Workshop on Modern Electron Paramagnetic Resonance (EPR) was hold on 6-9 November 2006 at METU Central Laboratory with over 50 participants from different universities and institutes of Turkey. The participation list is given in the following page. Prof. Dr. Deniz Uner and Prof. Dr. Cigdem Ercelebi were among the organization committee members. Electron Paramagnetic Resonance Spectroscopy has been explained generally theoretically and experimentally by three different speakers whose names given below.

d) Nanotechnology Research Forum

It was hold 16-20 October 2006 in Ankara Turkey. It was a Fall school on nanoscience and nanotechnology aimed towards graduate students and young Ph. D.'s interested in doing research in the area of nanoscience and technology. Over 200 young researchers participated in the Forum. One scientist from the METU-CENTER team (Prof. Rasit Turan) was among the organization committee members.

e) First National Catalysis Conference (NCC-I)

First National Catalysis Conference (NCC-1) has been organized at Middle East Technical University Northern Cyprus Campus on 17- 20 January 2007. Prof. Dr. Deniz Uner and Prof. Dr. Gurkan Karakas were among the organization committee. For detailed information web site of the conference is <http://www.metucenter.metu.edu.tr/ncc1/>

f) First Anatolian School on Catalysis (ASC-I)

First Anatolian School on Catalysis (ASC-I) has been organized on September 25, 2006- October 6, 2006 at METU campus. Two scientists from the METU-CENTER team (Prof. Dr Deniz Uner and. Prof. Dr Gurkan Karakas) were among the organization committee members. The school has been composed of two consecutive workshops named as Master class Catalysis and Comutational Catalysis. The course has taken five days with lectures of 6 hours per day. 16 lecturers were invited from different counties.

g) NANOMAT 2007 : International Workshop on Nanobiotechnology and Genome Technologies, October 31- November 3, 2007 Antalya-Turkey.

The Workshop on Nanobiotechnology and Genome Technologies was held on October 31- November 3, 2007 in Antalya-Turkey.

The workshop was an international workshop on nanobiotechnology and genome technologies which covers microarrays technologies, applications in agriculture food and safety, nanobiosensors, nanodelivery systems for drugs and genes. Details regarding the scope, list of invited speakers etc. can be seen at the conference website (www.metucenter.metu.edu.tr/nano2007/).Conference proceedings has been printed in an abstract book. Some financial support has been provided for the participants from Eastern European and EU-Candidate Countries including Turkey.Preparation work started in the last quarter of the year 2006. The committee members were selected from the members of the METU-CENTER project team. The organization committee was composed of these scientists: Prof. Dr. Meral Yücel, Prof. Dr. Rasit Turan, Prof. Dr. Hüseyin Avni Öktem, Prof. Dr. Ufuk Bakır, and Prof. Dr. Zümrüt Begüm Ögel. The final workshop program is in Deliverable 1.2.

h) NANOMAT 2008: International Workshop on Advanced Materials and Devices for Photovoltaic Applications April 24-25 2008, Ankara, Turkey.

The Workshop on Advanced Materials and Devices for Photovoltaic Applications was held on April 24-25 2008 in Ankara-Turkey..The workshop was an international workshop concentrated on thin film, third generation and advanced materials and devices concepts . Details regarding the scope, list of invited speakers etc. can be seen at the conference website (www.metucenter.metu.edu.tr/nanomat2008/).Organization committee members are Prof. Dr.Çiğdem Erçelebi, Prof. Dr. Rasit Turan, Prof. Dr. Macit Özenbaş, Prof. Dr. Levent Toppare. The booklet of Nanomat2007 is given in Deliverable 1.3

Task 2 Participation in conferences, workshop and special meetings consortium formation at other European centers

Young Researchers and experts from METU-CENTER have participated in various conferences and workshops in Turkey and Europe. Result of scientific investigations carried out by METU-CENTER members have been presented at these conferences and workshops. List of attended conferences and workshops is given in tabular form below.

Name of the person from METU-CENTER project group	Name of the conference attended	Conference date and location	Is the cost covered by METU-CENTER project? (Yes or No)
Prof. Dr. Rasit Turan	First International Workshop on Semiconductor Nanocrystals (SEMINANO2005)	September 10-12, 2005 Budapest-Hungary	No
Prof. Dr. Rasit Turan	International Conference on Surface Modification of Materials by Ion Beams	September 4-9, 2005, Kuşadası -Turkey	Yes
Prof. Dr. Deniz Üner	19 th NAM Catalysis Society Conference,	22-27 May, 2005, Philedelphia, PA. USA	No
Prof. Dr. Deniz Üner	ECOSS 23, European Conference on Surface Science,	September 4-9, 2005, BERLIN, Germany	Yes
Osman Bozkurt (Prof. Dr. Mahinur S. Akkaya's Lab student)	JIC, Genome Laboratory Conducting Affy-chip microarray analysis	September 24-November 3 2005	Partial support less than 30%
Mukaddes Can and Burcu Akça (Members Prof. Uner's group)	NANO-TR-1,	25-27 May 2005, Bilkent, ANKARA	No
Mukaddes Can, Hilal Demir, Volkan Değirmenci, Özlem Özcan, Ebru Erüinal(Members Prof. Uner's group)	EUROPACAT- VII, European Catalysis Society Conference	August 28 –September 1, 2005 Sofia Bulgaria.	No
Hilal Demir (Member Prof. Uner's group)	International Hydrogen Energy Congress and Exhibition,	13-15 July 2005, ISTANBUL	No
Volkan E. Genç (Member Prof. Uner's group)	ICOSCAR 2 International Conference on Structured Catalyts and Reactors	October 16-19, 2005. Delft, the Netherlands.	No
Volkan Değirmenci (Member Prof. Uner's group)	Gas to Fuel 05	November, 14-16, 2005, Brugge, Belgium	No
Assoc.Prof.Dr. Gurkan Karakas	NATO-ARW Meeting on Pure And Applied Surface Chemistry And Nanomaterials For Human Life And Environmental Protection	September 2005 Kyiv-Ukrain	No
Assoc. Prof. Dr. Gürkan KARAKAŞ	EMCC-4 4th Chemical Engineering Conference for Collaborative Research in Mediterranean Countries	Dead Sea-ISRAEL	Yes, partially
Prof. Dr. Hüseyin Avni Öktem	Pittcon-2006,	March 12-16,2006, Orlando, USA	Yes, partially
Prof. Dr. Hüseyin Avni Öktem	ACHEMA-2006	May 15-19, 2006, Frankfurt, Germany	No

Prof. Dr. Macit Özenbaş	NanoTR-1 Nanoscience and Nanotechnology 2005	25-27 May 2005 Ankara, Turkey	No
Prof. Dr. Macit Özenbaş	EUROMAT 2005 European Congress on Advanced Materials and Processes	5-8 September 2005 Prague, Czech Republic	No
Prof. Dr. Macit Özenbaş	12 th International Materials Congress	28 Sept. - 2 Oct. 2005 Istanbul, Turkey	No
Özge Acarbaş, Aylin Karakuşcu (Members Prof. Özenbaş's Group)	12 th International Materials Congress	28 Sept. - 2 Oct. 2005 Istanbul, Turkey	No
Prof. Dr. Macit Özenbaş	NanoTR-2 Nanoscience and Nanotechnology 2006	3-5 May 2006 Ankara, Turkey	No
Özge Acarbaş, Aylin Karakuşcu, Ali Erdem Eken (Members Prof. Özenbaş's Group)	NanoTR-2 Nanoscience and Nanotechnology 2006	3-5 May 2006 Ankara, Turkey	No
Prof. Dr. Çiğdem ERÇELEBİ	NanoTR-1 Nanoscience and Nanotechnology 2005	25-27 May 2005, Bilkent, ANKARA	No
Prof. Dr. Çiğdem ERÇELEBİ	NanoTR-2 Nanoscience and Nanotechnology 2006	3-5 May 2006 Ankara, Turkey	No
Prof. Dr. Ufuk Bakır	International Conference on nanomaterials in chemistry, biology and medicine	September 14-16, 2005- Kiev-Ukraine	No
Prof. Dr. Mürvet Volkan	International Metallurgy and Material Congress	September 28 –October 2 2005, İstanbul.	No
Prof. Dr. Mürvet Volkan	EuroMat 2005,	September 5-8 2005, Prague, Czech Republic	No
Prof. Dr. Raşit Turan	European Material Research Society Meeting	June 1, 2006, Nice, France	Yes
Prof. Dr. Zümrüt B. Ogel	Microarray principles and Applications	November, 30, 2006- 4 January, 2007, Ankara	Yes
Prof. Dr. Gürkan Karakaş	International Conference on Physical Chemistry- ROMPHYSICHEM 12	6-8 September 2006, Bucharest, Romania	Yes
Prof. Dr. Gürkan Karakaş	Workshop on Physics of Sensors and Detection Systems, ISPRA	6-7 December 2006, Milan, ITALY	Yes
Prof. Dr. Ufuk Bakır	Workshop on Physics of Sensors and Detection Systems, ISPRA	6-7 December 2006, Milan, ITALY	Yes
Prof. Dr. Macit Özenbaş	International Workshop on Nanostructured Materials NANOMAT 2006	June 21-23, 2006 Antalya, Turkey	Yes
Prof. Dr. Macit Özenbaş	13 th International Metallurgy and Materials Congress IMMC 2006	November 9-11, 2006 İstanbul, Turkey	No
Prof. Dr. Macit Özenbaş	III. International Boron Symposium	November 2-4, 2006, Ankara, Turkey	No
Prof. Dr. Macit Özenbaş	Materials Research Society MRS	November 27-December	Yes

	Fall 2006 Meeting	1, 2006, Boston, USA	
Prof. Dr.Deniz Uner	European Federation of Catalysis Council meeting	November 25, 2006 Paris France	Yes
M. Tufan Öz	5th PlantGEMs (Plant Genomics European Meetings)	11-14 October 2006, Venice, Italy	No
Prof.Dr.Raşit Turan	Nanotechnology Research Forum	2006, Turkey	No
Prof.Dr.Raşit Turan	EUCMOS 2006	2006, Turkey	No
Prof.Dr.Raşit Turan	E-MRS 2006 Spring Meeting	2006, France	Yes
Prof. Dr.Raşit Turan	International Workshop on Nanostructured Materials NANOMAT 2006	June 21-23, 2006 Antalya, Turkey	Yes
Prof. Dr. Raşit Turan	International Conference on Superlattices Nano-Structures and Nano- Devices	2006, Turkey	No
Prof. Dr. Çiğdem Erçelebi	International Workshop on Nanostructured Materials NANOMAT 2006	June 21-23, 2006 Antalya, Turkey	No
Prof. Dr. Mürvet Volkan	International Workshop on Nanostructured Materials NANOMAT 2006	June 21-23, 2006 Antalya, Turkey	Yes
M. Özenbaş, A. Karakuşcu	Third Seeheim Conference on Magnetism	Frankfurt, Germany, August 2007	Yes
Ö. Acarbaş, M. Özenbaş	Third Seeheim Conference on Magnetism	Frankfurt, Germany, August 2007	Yes
A. E. Eken, M. Özenbaş	Third Seeheim Conference on Magnetism	Frankfurt, Germany, August 2007	Yes
Ö. Acarbaş, M. Özenbaş	Materials Resarch Society MRS Spring 2008 Meeting	San Francisco, USA, March 2008	No
Murvet Volkan	Europtrode IX	March 30th, 2008 Dublin, Ireland	Yes
Deniz Üner	EUROPACAT 8, European Conference on Catalysis	August 26-31, 2007, Turku, Finland	Yes
Deniz Üner	EFCATS council meeting	August 25 2007, Turku, Finland	Yes
Gürkan Karakaş	SusChem Stakeholder & Brokerage event	29th -30th January 2008, Berlin, Germany	No
Tural B., Özkan N., Kocabaş A., Bakır U., Volkan M.	Nanomat 2007	October 31-November 03, Antalya, Turkey	Yes
Öztürk A.D., Bakır U, Ögel Z.B	13th European Congress on Biotechnology	16-19 September 2007, Barcelona	Yes
Ak, Ö., Akpınar, Ö., Bakır, U.	13th European Congress on Biotechnology	16-19 September 2007, Barcelona	Yes
Çolakoğlu T., Parlak M., Erçelebi Ç., Kaleli M., Huş M.Ş.	E-MRS Spring meeting,	28 May-1 June 2007 Strasbourg, France	Yes
Parlak M.	GET Univation(German-Turkish University Conference)	26-28 February 2007 Braunschweig, Germany	Yes
Çolakoğlu T., Kaleli M., Karaagaç H.	E-MRS Spring meeting	26-30 May, 2008 Strasbourg, France	Yes
Prof. Dr. Ufuk Bakır	SusChem stakeholder and	29-30 January, 2008,	Yes

	Brokerage Event	Berlin	
Prof. Dr. Çiğdem Erçelebi	22 nd European Photovoltaic Solar Energy Conference and Exhibition	3-7 September 2007, Milan Italy	Yes
Prof. Dr. Raşit Turan	22 nd European Photovoltaic Solar Energy Conference and Exhibition	3-7 September 2007, Milan Italy	Yes
Assoc. Prof. Dr. Necati Özkan	Nano Tr III NanoScience andTechnology Conference	11-14 June 2008 Bilkent Ankara	No
Prof. Dr. Raşit Turan, İlker Doğan, Ayşe Seyhan, Nader Moghaddam, Mustafa Kulakçı, Arife Gencer	SEMINANO 2007	13-16 June 2007, Bad Honnef, Germany	Yes
Prof. Dr. Raşit Turan, İlker Doğan	NANOMAT 2008	24-25 April 2008, Ankara, Turkey	Yes
İlker Doğan	E-MRS Spring 2008	26-30 May 2008, Strasbourg, France	Yes
Prof. Dr. Macit Özenbaş	Third Seeheim Conference on Magnetism	Frankfurt, Germany, August 2007	Yes
Özge Acarbaş, Ali Erdem Eken (Members Prof. Özenbaş's Group)	Third Seeheim Conference on Magnetism	Frankfurt, Germany, August 2007	Yes
Prof. Dr. Macit Özenbaş	Materials Resarch Society MRS Spring 2008 Meeting	San Francisco, USA, March 2008	No
Özge Acarbaş (Member Prof. Özenbaş's Group)	Materials Resarch Society MRS Spring 2008 Meeting	San Francisco, USA, March 2008	No

h) FP7 Project Proposals prepared by METU-CENTER Team.

Members of METU-CENTER team have prepared 3 research projects and proposed for FP7 program. The proposal titles, participations and abstracts of these projects are given below.

PROJECT 1 :

Proposal full title:

**NANOTECHNOLOGY AND NANOBIOTECHNOLOGY RESEARCH CENTER-
MIDDLE EAST TECHNICAL UNIVERSITY (NNRC-METU).**

Proposal Acronym : **NNRC-METU**

Type of funding scheme : **Coordination and support actions (Support)**

Work program topics addressed:

REGPOT-2008-1, Research Potential Work Program Article 4.1.

Co-ordinator name : **Prof. Dr. Rasit Turan**

PROJECT 2 : (this project is in negotiation phase)

Proposal full title:

NANOBIOSSENS

Proposal Acronym : **NANOBIOSSENS**

Type of funding scheme : **MARIE CURIE ACTIONS**

Call : **FP-7-PEOPLE-IRSES-2008**

REGPOT-2008-1, Research Potential Work Program Article 4.1.

Co-ordinator name : **Assist. Prof. Dr. Burcu Akata Kurc**

PROJECT 3 : (this project is in negotiation phase)

Project full title

Co-ordination in Nanometrology

Project acronym: **Co-Nanomet**

Grant agreement no.: **CSA-CA 218764 Co-Nanomet**

Date of preparation of Annex I (latest version): **14th May 2008**

Co-ordinator name : **Dr. Theresa Burke, UK**

PROJECT 4 :

Proposal Full Title:

**SEMICONDUCTORS AND METALIC NANODOTS FOR THIRD GENERATION
PHOTOVOLTAIC SOLAR CELLS**

Proposal Acronym: **SOLARDOTS**

Type of Funding Scheme: Small or Medium-Scale Focussed Research Projects
 Work Programme: FP7-2008-Energy-NMP-2: Novel materials for energy applications
 ENERGY.2008.10.1.2, NMP-2008-2.6-1

PROJECT 3 :

Proposal full title:

DEVELOPMENT OF HIGH-EFFICIENCY AND LOW-COST FUNCTIONAL NANOMATERIALS FOR MEMORY, SENSING AND ACTUATION APPLICATIONS USING BOTTOM-UP TEMPLATE TECHNOLOGIES

Proposal acronym: NANOWISE

Type of funding scheme: Small or medium-scale focused research project

Work programme topics addressed: 1.1.-2 Self-assembling and self-organisation

Name of the coordinating person: Prof. Mohammed Es-Souni

2.1.3 Deviations from the project workprogramme

There has been no significant deviation from the workprogram for this workpackage.

2.1.4. Deliverables for WP1

The name and the description of the deliverables are given below. Deliverables of the second year are highlighted. Future deliverable are in gray color.

Del. no.	Deliverable name	Workp ackage no.	Date due	Actual/Fore cast delivery date	Status
D1.1	Workshop booklet and attendance list of Workshop 1	WP1	01/07/2006	01/07/2006	Delivered
D1.2	Workshop booklet and attendance list of Workshop 2	WP1	01/07/2007	01/07/2007	Delivered
D1.3	Workshop booklet and attendance list of Workshop 3	WP1	01/05/2008	01/05/2008	Delivered
D1.4	Papers and abstracts presented at conferences and workshops	WP1	01/11/2006	01/11/2006	Delivered
D1.5	Papers and abstracts presented at conferences and workshops	WP1	01/05/2008	01/05/2008	Delivered
D1.6	Summary of one project proposal with METU-CENTER participation submitted or prepared for FP6/FP7 program on biotechnology for food quality and safety.	WP1	01/05/2007	01/05/2007	Delivered

D1.7	Summary of one project proposal with METU-CENTER participation submitted or prepared for FP6/FP7 program on biotechnology for food quality and safety.	WP1	01/05/2007	01/05/2007	Delivered
D1.8	Summary of one project proposal with METU-CENTER participation submitted or prepared for FP6/FP7 program on nanotechnology and nanosciences, knowledge based multifunctional materials, new production processes and devices.	WP1	01/05/2008	01/05/2008	Delivered
D1.9	Summary of one project proposal with METU-CENTER participation submitted or prepared for FP6/FP7 program on nanotechnology and nanosciences, knowledge based multifunctional materials, new production processes and devices.	WP1	01/05/2008	01/05/2008	Delivered

2.1.5 WP1 Milestones

The name and the description of the milestones are given below.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
1	See below	WP1	01.05.2006	01.05.2006	METU
2	See below	WP1	01.05.2007	01.05.2007	METU
3	See below	WP1	01.05.2008	01.05.2008	METU

1st Milestone : (01.05.2006)

12th month. Workshop 1 will be organized at the end of first 12 months. New perspectives for the research works and new collaboration initiatives are expected. Decisions on the form and date of the next workshop and info days will be taken at this stage.

Status : Workshop 1 which took place in Antalya on June 21-23, 2006 has been successfully organized with more than 200 participants. In addition, a national conference (NanoTRII) has been organized with 580 participants. It has been decided that next workshop will be on biotechnology and organized in autumn 2007.

2nd Milestone: (01.05.2007)

24th month: Organization of Workshop 2 will be completed. At least 2 research projects with METU-CL participation will be prepared to FP6/FP7 program. New perspectives for the research works and new collaboration initiatives are expected. Decisions on the form and date of the next workshop and info days will be taken at this stage.

Status: Organization of Workshop 2 has been successfully completed. It will take place in Antalya on October 31- November 03, 2007. Three research projects with METU-CL participation have been submitted to FP7 program.

3rd Milestone: (01.05.2008)

36th month: Workshop 3 will be organized in this last period of the project. Two new projects with METU-CL participation will be submitted to FP6/FP7 program.

Status: Organization of Workshop 3 has been successfully completed. It took place in Ankara on April 23-25, 2008. Three research projects with METU-CL participation have been submitted to FP7 program.

2.2 Achievements in WP2

2.2.1 Workpackage objectives.

The primary objective of this workpackage was to improve the human resources of METU-CENTER. Young scientists and experts of the working research groups were planned to be trained with short term visits to leading research centers in Europe and visits of experts and scientists from European centers to METU-CL. These visits are expected to contribute to the integration of METU-CL to major European laboratories and to the effective participation of METU-CL into EU Framework Programs and other research programs at European level.

Experts and Post.docs from excellent centers in Europe have been invited to METU-CL in order to participate in training activities at METU-CL. Transfer of knowledge on special experimental techniques and/or instruments was the main goal of this visits.

One of the major impacts of this work package is on the Ph.D. thesis completed in the above mentioned fields. About 25 Ph.D. theses are expected to be completed after three years of this project.

2.1.2 Tasks carried out and achievements:

Task 1 Young researchers and expert visits from METU-CENTER to European Research Centers

Ph D. students and Post.docs, who are employed in the Center, carried out some of their research work at the institutes hosting them. They have used the scientific results obtained during the visit in their thesis studies.

Visitor	Subject	To	Date
Selçuk YERCI	Traning on SIMS and XPS analysis	ITC Italy	10 August -14 September 2005
Osman BOZKURT	Genome Wide Expression Analysis of the Differentially Regulated Wheat Genes upon Treatment with Virulent and Avirulent Strains of Yellow rust pathogen <i>Puccinia striiformis</i>	JIC England	20 September- 23 October 2005
Uğur SERİNCAN	Sample preparation for TEM. (For Si nanocrystal investigation)	Enst Ruska-Centre for Microscopy and Spectroscopy GERMANY	10 April-5 May 2006
Zumrut B. Ogel	Research at METU-collaboration'	Wageningen, Holland	June 2006
Dr. Remziye Yılmaz	Microarray Data Analysis Course "GeneSpring Software"	Fungal Genomics Section, Wageningen University, Wageningen, The	13 May-4 June 2006

		Netherlands	
M. Tufan Öz	Microarray Data Analysis Course “GeneSpring Software”	Fungal Genomics Section, Wageningen University, Wageningen, The Netherlands	13 May-4 June 2006
İlker Yıldız	XPS studies	ETH Zurich	10 August-11 September 2006
Dr.Tamay Şeker	European Biotechnology Congress on Biotechnology	Barcelona Spain	September 16-19,2007
Assist. Prof. Dr. Arcan Dericioglu	Evaluating collaboration opportunities in the field of mechanical characterization of glass and ceramic matrix bulk - nanocomposite materials	IPM, Brno, Czech Republic	September 2007
Gokhan Kidil	Mechanical property measurements	IPM, Brno, Czech Republic	January-February 2008
Selen Gurbuz	Mechanical property measurements	IPM, Brno, Czech Republic	January-February 2008
Arife Gencer	Study on Si nanocrystal formation in SiC matrix	Julich Research Center, Germany	March 1-May 31, 2008

Task 2 Expert visits from European Research Centers to METU-CENTER

Expert visits from European research centers to METU-CENTER were organized for in-house training and education of the students and other research personnel at METU-CL. The activity have been in the form of seminars and short courses and training on a special measurement technique and instrument. The type of the activities is given in the table below.

Visitor	Activities/Seminar titles	From	Date
Prof. Dr. Serdar SARIÇİFTÇİ	Plastic Solar Cells	Linz Institute for Organic Solar Cells (LIOS), Physical Chemistry, Johannes Kepler University Linz Austria	24-26 October 2005
Prof. Dr. Dieter Michel Dr. Özlen Ferruh ERDEM	Solid State NMR Spectroscopy in Characterization of Zeolit Catalysts and Adsorbed Materials.	Physics of Dielectric Solids Institute of Experimental Physics II University of Leipzig	7-8 November 2005
Prof. Dr. Mehmet ERBUDAK	XPS Studies	Swiss Federal Institute of Technology(ETH) Zurich	19-20 December 2005
Prof. Dr. Leo De GRAFF, Dr. Luisa TRINDADE	Microarray Analysis	The Netherlands, Wageningen University Fungal Genomics Section, Laboratory of Microbiology	20-25 March 2006
Debashis Mukherji	Characterizing nanoparticles by TEM	Braunschweig Technical University/Germany	13-14 April 2006
Prof. Terje Finstad	Semiconductor Nanocrystals	University of Oslo	July 1, 2006- August 1, 2006
Prof. Rutger A. Van Santen	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Prof. J.W. Niemantsverdriet	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Dr. John van der Schaaf	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Prof. Dieter Vogt	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Prof. Thijs Vlugt	Anatolian School of Catalysis	Utrecht University	Sept 25- Oct. 6, 2006
Prof. Evert-Jan Meijer	Anatolian School of Catalysis	University of Amsterdam	Sept 25- Oct. 6, 2006
Prof. Marc Koper	Anatolian School of Catalysis	Leiden University	Sept 25- Oct. 6, 2006
Shuai Ban	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Evgeny Pidki	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Pieter van Grootel	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Freek Scheijen	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006

Thuat Trinh	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Danny Crulla	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Tonek Jansen	Anatolian School of Catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Ozlem Erdem	NMR in catalysis	Technical University of Eindhoven (TU/e)	Sept 25- Oct. 6, 2006
Prof. Dr. Richard Sanden	Plasma-Surface Interaction: in Situ and Real Time Studies During Plasma Processing of Materials	Eindhoven University of Technology	February 15, 2007
Prof. Dr. Abdelillah SLAOUI	Nanomaterials and Concepts for Photovoltaic Conversion/ Fabrication and Characterization of Crystalline Silicon Thin-Film Materials for Solar Cells	Centre National de la Recherche Scientifique Strasbourg, France	11-13 January 2006
Prof. Dr. Mehmet Erbudak	XPS Applications	ETH Zurich	27-29 September 2006
Prof. Dr. Şener Oktik	Nanomaterials and Concepts for Photovoltaic Conversion/ Fabrication and Characterization of Crystalline Silicon Thin-Film Materials for Solar Cells (audience)	Mugla University	11-13 January 2007
Prof. Dr. Atilla Yücel	Nanomaterials and Concepts for Photovoltaic Conversion/ Fabrication and Characterization of Crystalline Silicon Thin-Film Materials for Solar Cells (audience)	Mugla University	11-13 January 2007
Dr. Rüdiger-A. Eichel	Modern Electron Paramagnetic Resonance (EPR) Spectroscopy	Technische Universität Darmstadt, Germany	6-9 November 2006
Dr. Erdem Erdem	Modern Electron Paramagnetic Resonance (EPR) Spectroscopy	Technische Universität Darmstadt, Germany	6-9 November 2006
Prof. Dr. Stefan Weber	Modern Electron Paramagnetic Resonance (EPR) Spectroscopy	Freie Universität Berlin, Germany	6-9 November 2006
Prof. Dr. Margit Zacharias	From Nanocrystals to nanowires	Universität Paderborn and Max Planck Institute, Halle, Germany	30 January 2007
Sergei Dzyadevych	Electrochemical Enzyme Biosensors	Institute of Molecular Biology and Genetics, National Academy of Sciences of Ukraine	06 November 2006

Prof. Dr. Paul Russo	Dynamic Light Scattering	Louisiana State University	24 June 2006	
Sait Islam	Semiconductor Nano	University of California	15-21 October 2006	
H. Heining	Synthesis of Nanostructures with Ion Beam	TU Dresden	15-21 October 2006	
Ali Erdemir	Novel Approaches to the Development of Multifunctional Nanocomposite Coating	ANL	15-21 October 2006	
Nicole Jaffrezic-Renault CNRS, France	Biosensors	Conductometric Microbiosensors for Environmental Monitoring	January 22, 2007	January 24, 2007
Dr. Ozlen Erdem, University of Leipzig, Germany	NMR	Workshop on Solid State NMR Recent Developments	October 29,2007	November 3, 2007
Prof. Dieter Freude, University of Leipzig, Germany	NMR	Workshop on Solid State NMR Recent Developments	October 29,2007	November 3, 2007
Prof. Dr. Dieter Michel, , University of Leipzig, Germany	NMR	Workshop on Solid State NMR Recent Developments	October 29,2007	November 3, 2007
Prof. Dr. Mehmet Erbudak, ETH, Switzerland	XPS	Seminar/Visit to center	October 3, 2007	October 5, 2007
Dr. Giray Kartopu, Kiel University, Germany	Nanomaterials	Seminar/Visit to center		
Dr. Seamus Higson, UK	Biosensors	Seminar/Visit to center	September 19 2007	September 23 2007
Ekaterina Romanova, University of Leipzig, Germany	NMR	Workshop on Solid State NMR Recent Developments	October 29,2007	November 3, 2007
Mehmet Sankaya, Washington University, USA	Biomaterials	Nanomat 2007	October 31, 2007	November 4, 2007
Andrew Cuming, Leeds university, UK	Genetics	Nanomat 2007	October 31, 2007	November 4, 2007
Anthony Turner, Cranfield University, UK	Biosensors	Nanomat 2007	October 31, 2007	November 4, 2007
A. Bulak Arpat, University of Lausanne,	Genomics	Nanomat 2007	October 31, 2007	November 4, 2007

Lausanne, Switzerland				
Leo H. De Graaff, Wageningen University, Wageningen , The Netherlands	Micro Array	Nanomat 2007	October 31, 2007	November 4, 2007
Itamar Willner, The Hebrew University of Jerusalem, Israel	DNA based nanomachines	Nanomat 2007	October 31, 2007	November 4, 2007
S.M. Saqlan Naqvi, Department of Biochemistry, Pakistan	Cloning	Nanomat 2007	October 31, 2007	November 4, 2007
Mehmet Erbudak, ETH, Switzerland	XPS	Seminar/Visit to center	March 18, 2008	March 21 2008
Kyung Byung Yoon, Seoul University, Korea	Biosensors	Seminar/Visit to center	February 19, 2008	February 21
Christophe Ballif, University of Neuchatel, Switzerland	Thin Film Solar Cells	Nanomat 2008	April 23, 2008	April 26, 2008
Guy Beaucarne, IMEC, Leuven , Belgium	Solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Reinhard Carius, Jülich Research Center, Germany	SiC for solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Gavin Conibeer, University of NSW, Australia	2nd Generation solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Thomas Hannappel, Hahn-Meitner-Institut, Berlin, Germany	III-V based solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Siddik İçli, Ege University, Solar Energy Institute, Izmir, Turkey	Organic solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Antonio Marti, Instituto de Energia Solar - Universidad Politecnica de Madrid, Spain	Intermediate band solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Augustin McEvoy, Laboratory for	Dye synthesized solar cells	Nanomat 2008	April 23, 2008	April 26, 2008

Photonics and Interfaces, Switzerland				
Niyazi Serdar Sariçiftçi, Johannes Kepler Universität Linz, Austria	Organic solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Ayodhya Tiwari, Loughborough University, UK	CIGS based solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Helmut Tributsch, Hahn-Meitner-Institut, Berlin, Germany	Solar cell theorr	Nanomat 2008	April 23, 2008	April 26, 2008
Mario Tucci, ENEA, CTR, Casaccia, Rome, Italy	Heterojunction based solar cells	Nanomat 2008	April 23, 2008	April 26, 2008
Peter Würfel, University of Karlsruhe, Germany	Solar cell theory	Nanomat 2008	April 23, 2008	April 26, 2008

Task 3 Graduate studies in connection with the joint actions within METU-CENTER

METU-CENTER have been expected to generate M.Sc. and Ph.D. thesis studies as a part of human resource development program. These studies contain results of investigations that are supported by this SSA directly or indirectly. About 25 M.Sc. and Ph.D. thesis are expected to be supported at the end of three years. The number of expected publications in the international journals cited by SCI are expected to be around 25.

	Thesis Supervisor	Name of the student	Field of the thesis	Thesis title/topic	Status of the thesis
1	Prof. Dr. Rasit Turan	Mustafa Kulakci	Physics	Si nanocrystals embedded in SiO ₂ for light emitting diode (LED) applications	Completed in August 2005
2	Prof. Dr. Deniz Üner	Volkan Eyup Genç, , MS	Chem. Eng.	Diesel soot oxidation catalyst filter system design	Completed June 2005.
3	Prof. Dr. Deniz Üner	Özlem Özcan, MS	Chem. Eng.	Artificial photosynthesis	Completed July 2005.
4	Prof. Dr. Deniz Üner	Hakan Önder Olcay, MS	Chem. Eng.	Steam reforming of ethanol over sol gel synthesized mixed oxide catalysts,	Completed July 2005.
5	Prof. Dr. Deniz Üner	Ebru Erünel, , MS, ODTÜ	Chem. Eng.	Monte Carlo Simulations of supported mono and bi-metallic catalysts	Completed April 2006.
6	Prof. Dr. Mahinur S. Akkaya	Osman Bozkurt	Biotechnology	Expression level analysis upon fungal infection in wheat using Wheat Affymetrix GeneChips	Completed Summer 2006
7	Prof. Dr. Zümrüt Ögel	Gulden Koclar	Food Engineering	PCR cloning and heterologous expression of Scytalidium thermophilum laccase gene in Aspergillus sojae	Completed December 2005
8	Prof. Dr. Zümrüt Ögel	Burcal Gencer	Food Engineering	Analysis of the self-processing mechanism of galactose oxidase by site-directed mutagenesis and heterologus expressioncoli.	Completed December 2005
9	Prof. Dr. Raşit Turan	Selcuk Yerci	Semiconductor nanocrystals	Spectroscopic Characterization of Semiconductor Nanocrystals	Completed in January 2007
10	Prof. Ufuk Bakır/ (Co-adv) Prof.Zumrut B. Ogel	Didem Sutay	Protein structure and analysis	Purification of fungal polyphenol oxidases	Completed in 2007
11	Prof. Dr. Macit Özenbaş	Aylin Karakuşcu	Magnetic Thin Films	Characterization of Maghemite Thin Films Prepared by Sol-Gel Processing	Completed in October 2006
12	Prof. Dr. Hüseyin	M. Tufan Öz	Plant Functional	Microarray Based Expression	Continuing

	Avni Öktem		Genomics	Profiling of Barley (<i>Hordeum vulgare</i> L.) Under Boron Stress (PhD Thesis)	
13	Prof. Dr. Mürvet Volkan	Seher Karabıçak	Chemistry	Application of Surface-enhanced raman scattering (SERS) method for Genomics and Biomedical Analysis	Continuing
14	Prof. Dr. Macit Özenbaş	Özge Acarbaş	Materials Engineering	Magnetic Behaviour of Iron Oxide Nanoparticles	Completed February 2008
15	Prof. Dr. Macit Özenbaş	Ali Erdem Eken	Materials Engineering	Characterization of Nanostructured Magnetite Thin Films Produced by Sol-Gel Processing	Continuing
16	Prof. Dr. Hüseyin Avni Öktem	Tahir Bayraç	Biotechnology	Development of Aptamer production technologies for nanobiotechnology applications	Continuing
17	Prof. Dr. Hüseyin Avni Öktem	Taner Tuncer	Biotechnology	Development of nanoparticle based novel diagnosis platforms	Continuing
18	Prof. Dr. Raşit Turan	Mustafa Kulakçı	Semiconductor Nanocrystals	Electroluminescence Properties of Si nanocrystals	Continuing
19	Prof. Dr. Mürvet Volkan	Rukiye Sancı	Chemistry	Synthesis of Colloidal Ag Particles of Different Size by Seeding Approach for SERS Studies	Continuing
20	Assist. Prof. Dr Burcu Akata Kurc	Seçkin Öztürk	Biotechnology	Development of zeolite based biosensors	Continuing
21	Prof. Dr. Deniz Uner	Volkan Degirmenci	Catalysis	Methane Activation Via Bromination Over Sulfated Zirconia/Sba-15 Catalysts	Completed November 2007
22	Prof. Dr Raşit Turan	Umut Bostancı	Nanotechnology	Development of Atomic Force Microscopy System and Kelvin Probe Microscopy System for Use in Semiconductor Nanocrystal Characterization	Completed, 2007
23	Prof. Dr Raşit Turan	Ilker Dogan	Nanocrystals in Al ₂ O ₃	Formation of Si nanocrystals in Al ₂ O ₃ matrix	Completed soon in June 2008
24	Prof. Dr Raşit Turan	Arif Sinan Alagöz	Nanocrystal production by sputtering	Synthesizing Germanium And Silicon Nanocrystals Embedded In Silicon Dioxide By Magnetron Sputtering Deposition Technique	Completed, 2007
25	Prof. Dr. Zümrüt Ögel	Banu Metin	Food Engineering	Characterization and functional analysis of a novel multicopper oxidase and associated polyketide biosynthesis gene cluster of	Completed 2007

				aspergillus fumigatus	
26	Prof. Dr. Zümrüt Ögel	Ayla Öreroğlu	Food Engineering	In-vivo directed evolution of galactose oxidase by stationary phase adaptive mutations and phylogenetic analysis of error-prone polymerases	Completed 2007
27	Prof. Dr. Zümrüt Ögel	Gökhan Duruksu	Food Engineering	Expression and analysis of Endo Beta-1,4-Mannanase of Aspergillus Fumigatus in heterologous hosts	Completed 2007
28	Prof. Dr. Zümrüt Ögel	Abduvali Valiev	Food Engineering	Analysis of polyphenol oxidase production by southern pine beetle associated fungi	Completed 2007
29	Prof. Dr. Çiğdem Erçelebi	İdris Candan	Physics	Cu(In,Ga)Se based Thin Film heterojunction Solar Cells	Continuing
30	Prof. Dr. Zümrüt Ögel	Hatice Özlem Erçin	Food Engineering	Cloning of the scytalidium thermophilum bifunctional catalase	Completed 2008
31	Prof. Dr. Zümrüt Ögel	Tunca Doğan	Food Engineering	The effects of hydrogen peroxide, gallic acid and resveratrol on growth and catalase production of aspergillus fumigatus	Completed 2008
32	Prof. Dr. Macit Özenbaş	Halil İbrahim Yavuz	Materials Engineering	Dye Sensitized Solar Cells	Continuing
33	Prof. Dr. Deniz Üner	Burcu Akça MS, ODTÜ	Chem. Eng.	NO _x storage properties of mixed transition metal oxide catalysts	Completed September 2006.
34	Prof. Dr. Deniz Üner	Özge Güner MS, ODTÜ	Chem. Eng.	Lean-NO _x catalysis by precious metals	Completed September 2007.
35	Prof. Dr. Deniz Üner	Volkan Değirmenci, PhD, ODTÜ	Chem. Eng.	Methane activation catalysis	Completed November 2007.
36	Prof. Dr. Deniz Üner	Orçun Ergün PhD, ODTÜ	Chem. Eng.	Gas phase activation of stable organic molecules by visible light photocatalysis	In progress
37	Prof. Dr. Deniz Üner	Mehmet Mert Oymak	Chem. Eng.	Artificial photosynthesis over TiO ₂	In Progress
38	Prof. Dr. Deniz Üner	Osman Karshoglu	Chem. Eng.	Photocatalytic water splitting	In Progress

2.2.3 Deviations from the project workprogramme

- Implementation of the visit program between METU and European Centers has been slightly behind the plan given in Annex I. The main reason for this was lack of connections with people who can travel and stay abroad.

2.2.4. Deliverables for WP2

The name and the description of the deliverables are given below

Del. no.	Deliverable name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
D2.1	Activity reports on the students and experts visit to and from the METU-CENTER for the first 12 months.	WP2	01/07/2006	01/07/2006	Delivered
D2.2	Activity reports on the students and experts visit to and from the METU-CENTER for the second 12 months.	WP2	01/07/2007	01/07/2007	Delivered
D2.3	Activity reports on the students and experts visit to and from the METU-CENTER for the third 12 months.	WP2	01/05/2008	01/05/2008	Delivered
D2.4	Abstract of the published papers with the support of METU-CENTER for the first 18 months.	WP2	01/11/2006	01/11/2006	Delivered
D2.5	Abstract of the published papers with the support of METU-CENTER for the second 18 months.	WP2	01/11/2006	01/11/2006	Delivered

2.2.5 WP2 Milestones:

The name and the description of the milestones are given below.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
1	See below	WP2	01.05.2006	01.05.2006	METU
2	See below	WP2	01.05.2007	01.05.2007	METU
3	See below	WP2	01.05.2008	01.05.2008	METU

1st Milestone: (01.05.2006)

12th month: At the end of the first year, 14 man-month effort (3-10 visits) will be spent for the student and expert visits from METU-CENTER to other European Centers. About 6 man month-effort will be spent for the visit of experienced scientists and experts from the European centers to METU-CENTER. 2 seminar/short course and 2-3 expert visits will be organized.

Status : In the first year of the project, students were sent to other European research center, and 5 expert visits from European centers have been realized. 12 seminars/lectures have been organized. Also training and tutorial on some special measurement techniques and instruments have been realized.

2nd Milestone: (01.05.2007)

24th month: In the second 12 months of the project 24 man-month (5-15 visits) efforts will be used for the student and expert visits from METU-CENTER to other European Centers. About 12 man month-effort will be spent for the visit of experienced scientists and experts from the European centers to METU-CENTER. 3 seminar/short course and 3-8 expert visits will be organized.

Status: In the second 12 months 5 students were sent to European research centers and 40 expert visits from European centers have been realized. Many seminars, training and tutorial on some special measurement techniques and instruments have been realized.

3rd Milestone: (01.05.2008)

36th month: in the third 12 months of the project 14 man-month (4-10 visits) effort will be used for the student and expert visits from METU-CENTER to other European Centers. About 6 man month-effort will be spent for the visit of experienced scientists and experts from the European centers to METU-CENTER. 3 seminar/short course and 3-5 expert visits will be organized.

Status: In the third 12 months, 5 students were sent to European research centers and 30 expert visits from European centers have been realized. Many seminars, training and tutorial on some special measurement techniques and instruments have been realized.

2.3 Achievements in WP3

2.3.1 Workpackage Objectives

Objectives:

The objective of this work package was to create efficient organization and management procedures for the success of the project. The following summarizes the organizational approach to various issues to be dealt with during the course of the management process. There is only one legal participant (METU) in this SSA project. The Coordinator of the METU-CENTER project is Prof. Dr. Rasit Turan of Middle East Technical University. The main management organ of the METU-CENTER will be Executive Committee.

2.3.2 Tasks carried out and achievements:

a) Management structure

Management of METU-CENTER consortium is being carried out through the following organs :

- a. General Assembly (GA)
- b. Executive Committee (EC)

General Assembly (GA) is composed of all participating members of the METU CENTER members. The GA has the obligation to provide the necessary oversight to ensure that the project team functions properly. The GA has been meeting twice a year. Extraordinary meetings were called by the Chair whenever necessary.

Executive Committee (EC) : The EC has five members including the Chair. The representatives of the groups leading the three workpackages are normally nominated to the EC. The Chair of EC is the coordinator of the project. EC has been holding regular meetings every month. The EC members are

Prof. Dr. Rasit Turan, Prof. Dr. Macit Ozenbas, Prof. Dr. Deniz Uner, Prof. Dr. Meral Yücel, Prof. Dr. Çiğdem Erçelebi.

b) Web page preparation and management

A project web page has been set up at the address <http://www.metucenter.metu.edu.tr>. This web page contains general information about the project. The web page has been updated with the new information as they become available.

c) Coordination of project activities

Coordination of scientific activities has been an important management task from the beginning of the project. Exchange of information, material and knowledge between the members of the project

team have been coordinated mostly by the coordinator through GA meetings and through e-mail communication.

2.3.3 Deviations from the project workprogramme

No significant deviation could be reported for this workpackage

2.3.4. Deliverables for WP3

The name and the description of the deliverables are given below. Deliverables of the second year are highlighted. Future deliverables are in gray color.

Del. No.	Deliverable name	Workpackage no.	Date due	Actual/Forecast delivery date	Est. ind. person-months	Used ind. person-months	Lead contractor
D3.1	Periodic activity report for the first 12 month	WP3	01/07/2006	01/07/2006			Delivered
D3.2	Periodic activity report for the second 12 month	WP3	01/07/2007	01/07/2007			Delivered
D3.3	Final report for the whole project	WP3	01/05/2008	01/05/2008			Delivered

2.3.5 WP3 Milestones:

The name and the description of the milestones are given below.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
1	See below	WP3	01.05.2006	01.05.2006	METU
2	See below	WP3	01.05.2007	01.05.2007	METU

1st Milestone: (01.05.2006)

12th month: Activities planned in the other 4 work packages will be realized. They will be re-evaluated at this stage and new decision will be made if necessary.

Status: Activities planned have been generally realized.

2nd Milestone: (01.05.2007)

24th month: Activities planned in the other 4 work packages will be realized. They will be re-evaluated at this stage and new decision will be made if necessary.

Status: Activities planned have been generally realized.

2.4 Achievements in WP4

2.4.1 Workpackage Objectives

The objective of this work package was to form an effective networking between scientists of METU-CL and other national and international research institutes to help creation of synergy for cooperative activities between them. There are different tools for the integration. All activities formulated in WP1 and WP2 were to contribute to the development of an effective networking. Web page development and development of a network structure with associate membership have been the main tasks in this work package.

2.4.2 Tasks carried out and achievements:

Task 1 Web site development

The METU-CENTER webpage is designed to disseminate and collect information and make announcement related to the activities that are performed in the scope of METU-CENTER project. The webpage is uploaded on 15 August 2005 to the address “<http://www.metucenter.metu.edu.tr>” as planned in Annex I of the project contract. After this date the webpage has been used by the users. The announcement and organization of Nanomat2006, Nanomat2007 and Seminano 2007 workshops are three of the most important activities carried out through the METU-CENTER web page. Nanomat2006 took place at the end of June 2006 in Antalya Turkey with more than 250 participations from Europe and rest of the world. METU-CENTER webpage served as the workshop web page at which participants can submit their abstracts and receive information about this workshop. The web page has been used using for the announcement of the Seminano 2007 which was organized in Germany on June 13-16, 2007 with about 75 participants. (<http://www.metucenter.metu.edu.tr/seminano2007/>), Nanomat 2007 took place in Antalya on October 31- November 3 (<http://www.metucenter.metu.edu.tr/nanomat2007/>) with about 100 participants. Finally Nanomat 2008 was organized on METU campus on April 24-25 with about 250 participants (<http://www.nnrc.metu.edu.tr/nanomat2008>). The web site was effectively used for these events. The usage statistics of the web site is given in Deliverable 4.5

Task 2 Associate membership to METU-CENTER

Associate membership is a mechanism to connect the researcher outside METU to the project METU-CENTER. Also, the consequence of being associate member to the projects such as the benefits that members will get needed to be studied and decided. Only researches working in the field of interests of METU-CENTER are accepted to the membership. Members of METU-CENTER receive information regarding events and projects that will be organized by METU-CENTER. Also, they have priority in participation of events such as info days, workshops, conferences. They are able to download documents such as reports, papers etc. Also, they are able to collobrate with METU-CENTER to generate new projects will be able to disseminate information regarding their institute and activities and they are able to request to use METU-CENTER's electron beam lithography system. The list of associated members is given in Deliverable 4.6.

2.4.4. Deliverables for WP4

The name and the description of the deliverables are given below.

Del. no.	Deliverable name	Workpackage no.	Date due	Actual/Forecast delivery date	Status
D4.1	Copy of printed version of the web page	WP4	01/09/2005	01/09/2005	Delivered
D4.2	Copy of the new version of the web page after 12 months.	WP4	01/07/2006	01/07/2006	Delivered
D4.3	Report containing statistics on the usage of the web site.	WP4	01/11/2006	01/11/2006	Delivered
D4.4	List of associate members and their activities in connection with METU-CENTER.	WP4	01/11/2006	01/11/2006	Delivered
D4.5	Final report containing statistics on the usage of the web site.	WP4	01/05/2008	01/05/2008	Delivered
D4.6	Final report on associate members and their activities in connection with METU-CENTER	WP4	01/05/2008	01/05/2008	Delivered

2.4.5. WP4 Milestones

The name and the description of the milestones are given below.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
1	See below	WP4	01.08.2005	01.08.2005	METU
2	See below	WP4	01.05.2006	01.05.2006	METU
3	See below	WP4	01.05.2007	01.05.2007	METU

1st Milestone: (01.08.2005)

3rd month: Web site will be operational at this stage for spreading information and communication.

Status: Web site was operational at the end of 3rd month of the project. A separate deliverable has been prepared on the web site.

2nd Milestone: (01.05.2006)

12th month: Web site will be in a more developed and complete form which include data base for European centers and list of associate members and links to their home pages. The number of associate members is expected to be 50 after 12 months.

Status: The web site was improved with the addition of Nanomat2006 pages. The associate membership procedure has not been started yet.

3rd Milestone: (01.05.2007)

24th month: Web site will contain information about all research centers and labs working in the research fields of the METU-CENTER. The number of associate members will exceed 150 at this stage.

Status: At the end of the second year the number of members exceeds 150 which is number proposed in the technical annex of the project. Most of the members are from Turkey as we are expected.

2.5 Achievements in WP5.

2.5.1 Workpackage Objectives

The objective of this work package was to improve the research infrastructure of METU-CL in the material preparation and processing. METU-CL has a strong equipment park in the test and characterization of materials and devices. The aim of this project was to improve experimental conditions of material and device processing of the METU-C. This improvement is expected to raise the excellence of the center to the same level as the excellent research centers of Europe. Upgrading the central research laboratory facility with installation of micro array system, installation of SEM with a lithography system and construction of clean room have accelerated the research activities in the area of nanotechnology and nanosciences, knowledge based multifunctional materials, new production processes and devices (NMP), and molecular biology and biotechnology for food quality and safety.

2.5.2 Tasks carried out and achievements:

Purchase, construction, and installation of the equipments given above have been completed. Below a short description of the progress and examples of the research results obtained from these equipments are given.

A 95 m² clean room with material processing facilities have been constructed. The clean room has been divided into two parts, first part is being used for lithography and device processing, and the second part is being used as chemical process lab for sample and material preparation for the spectroscopy purposes. Some of the equipments needed for the operation of clean room, such as tube furnace ovens, ultra pure water system have been purchased by using university's own resources.

Scanning electron microscope with a lithography attachment: Scanning electron microscope (SEM) with an electron beam lithography attachment was installed in the clean room in June 2006. The SEM has been used for the imaging purposes in general. Lithography attachment has been useful to facilitate the fabrication of nanostructures at the central laboratory. Some small additional equipments like oven and spinner have been purchased to complete the lithography system.

Lithography is the key of the nano and micro fabrication processes. Compared to the other lithographic techniques E-Beam lithography is the most suitable technique for research purposes. Although EBL has a low throughput, the design flexibility and the prototyping ability of this technique makes it a good research tool. Lithography system attached conventional SEM is preferred because of its relatively high performance/price ratio.

In order to see the patterning and imaging properties of the system, some studies have been carried out with the samples obtained by the department of physics and chemical engineering. Detailed information is given in deliverable 5.2.

The micro array system (including printing robot) have been purchased and installed in the first year of the project On March 20-25 2006 a Microarray Training Analysis course was organized in METU-CL. The course was given by Prof.Dr. Leo de Graaff and Dr.Luisa Trindade from The Netherlands, Wageningen University Fungal Genomics Section, Laboratory of Microbiology.

A Rapid Thermal Processing (RTP) system has been purchased and installed in the lab. RTP system was necessary for the lab to for heat treatments of samples in clean room. Having this system has made it possible to carry out complete device processing under clean environment.

2.5.3 Deviations from the project workprogramme

No significant deviation can be reported for this workpackage.

2.5.4. Milestones and deliverables for WP5

The name and the description of the deliverables are given below.

Del. no.	Deliverable name	Work package no.	Date due	Actual/Forecast delivery date	Status
D5.1	Report on the installation of all of the equipments	WP5	01/07/2006	01/07/2006	Delivered
D5.2	Examples of the research results obtained from SEM and examples of devices fabricated by using the installed lithography system attached to SEM.	WP5	01/05/2007	01/05/2007	Delivered
D5.3	Sample results on gene expression analysis with wheat genome chips.	WP5	01/05/2007	01/05/2007	Delivered

2.5.5 WP5 Milestones

The name and the description of the milestones are given below.

Milestone no.	Milestone name	Workpackage no.	Date due	Actual/Forecast delivery date	Lead contractor
1	See below	WP5	01.03.2006	01.03.2006	METU
2	See below	WP5	01.03.2007	01.03.2007	METU

1st Milestone: (01.05.2006)

All equipments will be purchased and installed.

Status: All equipments have been purchased except for the electron beam lithography system which will be installed in June 2006.

2nd Milestone: (01.05.2007)

24th Month: Examples and research results in the research fields mentioned in the objectives will be generated by using instruments purchased through this project.

Status: Installation of the electron beam lithography system has been completed. The first results have been obtained by using the instruments purchased through the project.

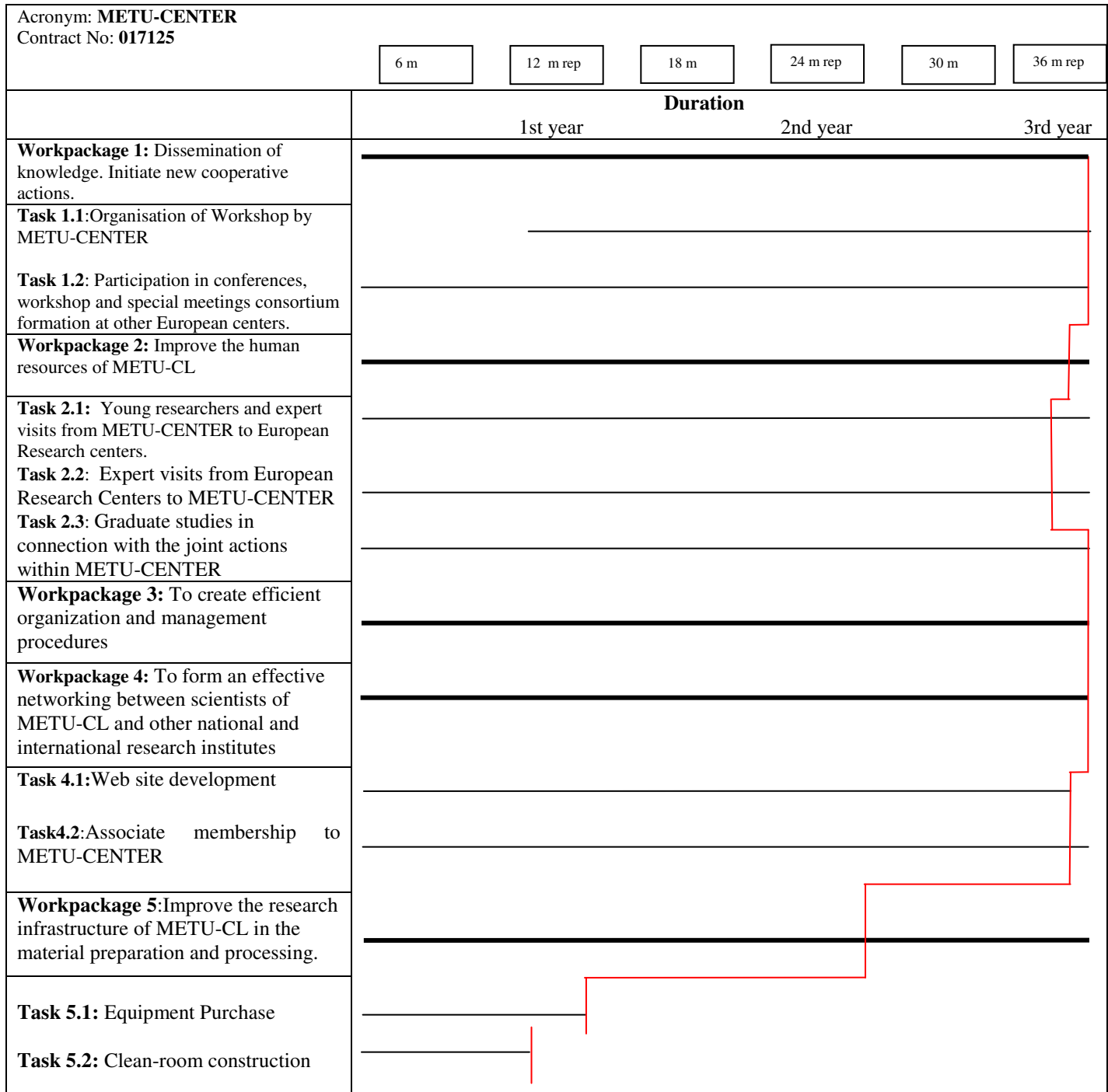
3 PROJECT MANAGEMENT**3.1 Project management tasks, achievements and problems.**

Management of METU-CENTER project is a separate workpackage as described above. Tasks, achievements and problems of management are given in the description of WP3.

3.2 Project time table and status

PROJECT BARCHART and STATUS

Final



3.3 Coordination activities

A summary of coordination of scientific activities is given above under the title of management tasks.

3.3.1 Project Meetings Details

<i>Title</i>	<i>Data and Place</i>	<i>Main conclusions</i>
EC committee meetings	Ankara	EC meetings have been held every month. Activities were discussed and decisions about the tasks were taken.
GA meeting	Ankara	GA was met three times during second year of the project. All activities were evaluated necessary decisions were taken.