

## CURRICULUM VITAE OF YANTAO LI

### **Contact Information**

The Institute of Marine and Environmental Technology  
The University System of Maryland  
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### **Education Background**

2002-2007 Ph. D. (Microbial Biotechnology), The University of Hong Kong (HKU),  
Hong Kong  
1998-2002 B. S. (Plant Biology), Nanjing University, P.R. China

### **Research and Professional Experience**

2012-present Assistant Professor, The Institute of Marine and Environmental  
Technology (IMET), The University System of Maryland  
2009-2012 Assistant Research Professor, Department of Applied Sciences and  
Mathematics at Arizona State University (ASU)  
2008-2009 Post-doc Researcher, Department of Applied Biological Sciences at ASU  
2007-2008 Post-doc Researcher, School of Biological Sciences at HKU  
2002-2007 Teaching and Research Assistant, Dept. of Botany at HKU (2002-2004)  
and Dept. of Plant Biology at ASU (2004-2006)

### **Major Research Interests**

Using systems biology and molecular biology approaches to investigate the pathways for  
and regulation of lipid synthesis and turnover in microalgae; employing rational genetic  
engineering strategies to manipulate algae for production of biofuels and high-value  
products.

### **Academic Awards**

2010 Travel Awards for 14th the International Conference on the Cell and  
Molecular Biology of *Chlamydomonas* (Genetics Society of America,  
USA).  
2002-2007 Postgraduate Scholarship (HKU, Hong Kong)  
1998-1999 Renmin Scholarship (Nanjing University, China)

### **Publications**

A. Journal articles (\*indicates IMET student or postdoc trainees)

\*Wang Y, \*Lee Y-Y, Santaus TM, \*Newcomb CE, \*Liu J, Geddes CD, Zhang C, Hu Q,  
**Li Y** (2017) In situ enzymatic conversion of *Nannochloropsis oceanica* IMET1 biomass  
into fatty acid methyl esters. **BioEnergy Research**. doi:10.1007/s12155-016-9807-2

\*Liu J, \*Lee YY, Mao X, and **Li YT** (2017) A simple and reproducible non-radiolabeled *in vitro* assay for recombinant acyltransferases involved in triacylglycerol biosynthesis. **J. Appl. Phycol.** doi:10.1007/s10811-016-0949-6

\*Lenka SK, Carbonaro N, Park R, Miller SK, Thorpe I, **Li YT**. (2016) Current advances in molecular, biochemical, and computational modeling analysis of microalgal triacylglycerol biosynthesis. **Biotechnology Advance.** 34: 1046-1063.

\*Liu J, Han D, Yoon K, Hu Q, **Li YT** (2016) Characterization of type 2 diacylglycerol acyltransferases in *Chlamydomonas reinhardtii* reveals their distinct substrate specificities and functions in triacylglycerol biosynthesis. **Plant Journal** 86, 3-19. (Cover story and featured article)

Jia J, Han DX, Gerken H, **Li YT**, Sommerfeld M, Hu Q, Xu J (2015) Molecular mechanisms for photosynthetic carbon partitioning into storage neutral lipids in *Nannochloropsis oceanica* under nitrogen-depletion conditions. **Algal Research** 7, 66-77.

\*Wang Y, \*Liu J, Gerken H, Zhang CW, Hu Q, **Li YT** (2014) Highly-efficient enzymatic conversion of crude algal oils into biodiesel. **Bioresour. Technol.** 172, 143-149.

Li J, Han DX, Wang D, Ning K, Jia J, Wei L, Jing X, Huang S, Chen J, **Li YT**, Hu Q, Xu J (2014) Choreography of transcriptomes and lipidomes in *Nannochloropsis* reveals the mechanisms of oleaginousness in microalgae. **Plant Cell** 26: 1645-1665. (Highly cited article; top 1% based on ISI Web of Science citations for Plant & Animal Science)

\*Liu J, Gerken H, **Li Y** (2014) Single-tube colony PCR for DNA amplification and transformant screening of oleaginous microalgae. **J. Appl. Phycol.** 26: 1719-1726

Han DX#, **Li YT**#, Hu Q (2013) Astaxanthin in microalgae: pathways, functions and biotechnological implications. **Algae** 28: 131-147 (#Equal contribution)

Yoon K, Han D, **Li Y**, Sommerfeld M, Hu Q (2012) Phospholipid:diacylglycerol acyltransferase is a multifunctional enzyme involved in membrane lipid turnover and degradation while synthesizing triacylglycerol in the unicellular green microalga *Chlamydomonas reinhardtii*. **Plant Cell** 24: 3708-3724 (Highly cited article)

**Li Y**, Han D, Sommerfeld M, Hu Q (2011) Photosynthetic carbon partitioning and lipid production in the oleaginous microalga *Pseudochlorococcum* sp. (Chlorophyceae) under nitrogen-limited conditions. **Bioresour. Technol.** 102: 123-129

Packer A, **Li YT**, Andersen T, Hu QA, Kuang Y, Sommerfeld M (2011) Growth and neutral lipid synthesis in green microalgae: A mathematical model. **Bioresour. Technol.** 102: 111-117

**Li Y**, Han D, Hu G, Dauvillee D, Sommerfeld M, Ball S, Hu Q (2010) *Chlamydomonas* starchless mutant defective in ADP-glucose pyrophosphorylase hyper-accumulates triacylglycerol. **Metabolic Engineering** 12: 387-391 (Highly cited article)

**Li Y**, Han D, Hu G, Sommerfeld M, Hu Q (2010) Inhibition of starch synthesis results in overproduction of lipids in *Chlamydomonas reinhardtii*. **Biotechnol. Bioeng.** 107: 258-268 (Highly accessed article)

Li Y, Sommerfeld M, Chen F, Hu Q (2010) Effect of photon flux densities on regulation of carotenogenesis and cell viability of *Haematococcus pluvialis* (Chlorophyceae). **J. Appl. Phycol.** 22: 253-263

Li Y, Huang J, Sandmann G, Chen F (2009) High-light and sodium chloride stress differentially regulate the biosynthesis of astaxanthin in *Chlorella zofingiensis* (Chlorophyceae). **J. Phycol.** 45: 635-641

Hu Z, Li Y, Sommerfeld M, Hu Q (2008) Enhanced protection against oxidative stress in an astaxanthin-overproduction *Haematococcus* mutant (Chlorophyceae). **Eur. J. Phycol.** 43: 365-376

Huang JC, Liu J, Li YT, Chen F (2008) Isolation and characterization of the phytoene desaturase gene as a potential selective marker for genetic engineering of the astaxanthin-producing green alga *Chlorella zofingiensis* (Chlorophyta). **J. Phycol.** 44: 684-690

Li Y, Huang J, Sandmann G, Chen F (2008) Glucose sensing and the mitochondrial alternative pathway are involved in the regulation of astaxanthin biosynthesis in the dark-grown *Chlorella zofingiensis* (Chlorophyceae). **Planta** 228: 735-743

Li Y, Sommerfeld M, Chen F, Hu Q (2008) Consumption of oxygen by astaxanthin biosynthesis: A protective mechanism against oxidative stress in *Haematococcus pluvialis* (Chlorophyceae). **J Plant Physiol** (Highly accessed article)

Sun N, Wang Y, Li YT, Huang JC, Chen F (2008) Sugar-based growth, astaxanthin accumulation and carotenogenic transcription of heterotrophic *Chlorella zofingiensis* (Chlorophyta). **Process Biochem.** 43: 1288-1292

#### B. Book Chapter

Li Y, Han D, Yoon K, Zhu S, Sommerfeld M and Hu Q. Molecular and Cellular Mechanisms for Lipid Synthesis and Accumulation in Microalgae: Biotechnological Implications. (2013) In ***Handbook of Microalgal Culture, 2nd Edition***; Amos Richmond and Qiang Hu, editors. In press, Chapter 28, pp. 545-565

Han D, Li Y, and Hu Q. Biology and Commercial Aspects of *Haematococcus pluvialis*. (2013) In ***Handbook of Microalgal Culture, 2nd Edition***; Amos Richmond and Qiang Hu, editors. Chapter 20, pp. 388-405

Lee Y, Chen W, Shen H, Han D, Li Y, Jones H, Timlin J, and Hu Q (2013) Basic Culturing and Analytical Measurement Techniques. In ***Handbook of Microalgal Culture, 2nd Edition***; Amos Richmond and Qiang Hu, editors. Chapter 3, pp. 37-68

#### ***Invited Seminars and Presentations***

##### A. Departmental Seminars

Li Y. (2016) *Fit or Fat: Microalgal lipid biochemistry and biotechnology*. Department of Chemistry and Biochemistry, University of Maryland Baltimore County. Baltimore, MD (The 2016 distinguished speaker selected by the UMBC Chemistry Graduate Student Association)

**Li Y.** (2016) *Fit or Fat: Microalgal lipid biochemistry and biotechnology*. Department of Civil and Environmental Engineering, New Jersey Institute of Technology, Newark, NJ.

**Li Y.** (2015) *Triacylglycerol and Carotenoid Synthesis in Microalgae: Pathways and Biotechnological Implications*, College of Engineering, Peking University, Beijing, China.

**Li Y.** (2015) *Introduction to Marine and Environmental Technology: Algal Biology and Biotechnology*, School of Life Sciences and Medical Engineering, Tongji University, Shanghai, China.

**Li Y.** (2015) *Triacylglycerol and Carotenoid Synthesis in Microalgae: Pathways and Biotechnological Implications*, The Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Science, Qingdao, China.

**Li Y.** (2014) *Triacylglycerol synthesis and storage in the plastid of microalgae*. Institute of Hydrobiology, Chinese Academy of Science, Wuhan, China.

**Li Y.** (2013) *Triacylglycerol Synthesis and Storage in Microalgae: Pathways, Regulation and Biotechnological Implications*. Department of Biological Sciences, UMBC, Baltimore, MD

**Li Y.** (2013) *Microalgae for Fuels and Biochemicals*. UMCES faculty convocation at Appalachian Laboratory. Frostburg, MD

**Li Y.** (2013) *Chloroplast Lipid Synthesis and Turnover in Microalgae: Pathways, Regulation and Biotechnological Implications*. UMCES Chesapeake Biological Laboratory, Solomons, MD

**Li Y.** (2013) *Triacylglycerol Synthesis and Storage in Microalgae: Pathways, Regulation and Biotechnological Implications*. UMCES Horn Point Laboratory, Cambridge, MD

**Li Y.** (2011) *Understanding the pathways for and regulation of triacylglycerol synthesis and accumulation in microalgae*. School of Biological Sciences, University of Nebraska–Lincoln, Lincoln, NE

**Li Y.** (2011) *Understanding the pathways for and regulation of triacylglycerol synthesis and accumulation in microalgae*. Department of Chemistry and Geochemistry, Colorado School of Mines, Golden, CO

**Li Y.** (2011) *Metabolic Pathways, Regulation and Engineering of Microalgae for Biofuel*. The Qingdao Institute of Bioenergy and Bioprocess Technology, Chinese Academy of Science, Qingdao, China.

B. Conference Proceedings (\*indicates student or postdoc presenter)

**Li Y.** (2016) *Fit or Fat: The Molecular Mechanism and Bioenergy Implications of Triacylglycerol (TAG) Biosynthesis in Microalgae*. **Keynote speaker and chair for Marine Bioenergy and Environmental Marine Biotechnology session**, the

International Marine Biotechnology Conference, 8/29/2016 to 9/2/2016, Baltimore, MD, USA.

**Li Y.** (2016) Glycerolipid Metabolism in Microalgae: Molecular Mechanism and Bioenergy Implications. **Invited speaker**, The 3<sup>rd</sup> SDIC Microalgae Biotechnology Symposium, 9/22/2016, Beijing, China.

**Li Y.** (2016) Fit or Fat: The Molecular Mechanism and Bioenergy Implications of Triacylglycerol (TAG) Biosynthesis in Microalgae. **Invited speaker**, From Bioprospecting to Lipid Biology and Photosynthesis session, the 4th Asia-Oceania Algae Innovation Summit, 9/18/2016 to 9/21/2016, Wuhan, China.

**Lee Y\***, Liu J and Li Y. (2016) CHARACTERIZATION OF DIACYLGLYCEROL ACYLTRANSFERASE 2 (DGAT2) IN THE MARINE MICROALGA *NANNOCHLOROPSIS OCEANICA* IMET1. Poster, the International Marine Biotechnology Conference, 8/29/2016 to 9/2/2016, Baltimore, MD, USA.

**Li Y.** (2015) Characterization of diacylglycerol acyltransferases in *Chlamydomonas reinhardtii*: Substrate specificity and their roles in triacylglycerol biosynthesis. **Invited speaker** at the 2015 Algae Biomass Summit, 9/29/2015 to 10/2/2015, Washington, District of Columbia, USA.

**Lee Y\***, Feng J, Liu J and Li Y. (2015) Characterization of a phospholipid: diacylglycerol acyltransferase (PDAT) from an oleaginous marine microalga *Nannochloropsis oceanica* IMET1. Poster, 2015 Algae Biomass Summit, 9/29/2015 to 10/2/2015, Washington, District of Columbia, USA.

**Liu J\***, Han D, Yoon K, Hu Q and Li Y. (2014) Substrate specificity and positional preference of *Chlamydomonas* diacylglycerol acyltransferases critical for stress-related biosynthesis of triacylglycerol. Oral presentation in the 16th International Conference on the Cell and Molecular Biology of *Chlamydomonas*.

**Liu J\*** and Li Y. (2013) Single-tube colony PCR of microalgae for fast and reliable DNA amplification and transformant determination. Poster presentation, In 7th Annual Algae Biomass Summit, Sep. 30 – Oct. 3, 2013 at Orlando, FL, USA.

**Li Y**, Yoon K, Han D, Sommerfeld M and Hu Q. (2011) Toward understanding the pathways for and regulation of triacylglycerol synthesis and accumulation in microalgae. **Invited speaker** at in the 5th Annual Algae Biomass Summit, October 25 - 27, 2011, Minneapolis, Minnesota, USA.

**Li Y**, Yoon K, Han D, Sommerfeld M and Hu Q. (2011) A TYPE-2 ACYL-CoA:DIACYLGLYCEROL ACYLTRANSFERASE GENE IS ESSENTIAL FOR ENDOPLASMIC RETICULUM-BASED TRIACYLGLYCEROL SYNTHESIS IN *CHLAMYDOMONAS REINHARDTII*. In 2011 Phycological Society of America Annual meeting, July 13-16, 2011, Seattle, WA USA.

**Yoon K**, Han D, Li Y, Sommerfeld M and Hu Q. (2011) PHOSPHOLIPID:DIACYLGLYCEROL ACYLTRANSFERASE IS INVOLVED IN LIPID SYNTHESIS AND DEGRADATION IN *CHLAMYDOMONAS REINHARDTII*.

In 2011 Phycological Society of America Annual meeting, July 13-16, 2011, Seattle, WA USA.

**Li Y**, Han D, Yoon K, Sommerfeld M and Hu Q (2010) Comparative transcriptomic and metabolomic study reveals that *DGAT2*, a gene encoding type-2 diacylglycerol acyltransferase, is involved in hyper-accumulation of triacylglycerol in a *Chlamydomonas reinhardtii* starchless mutant. In 4th Annual Algae Biomass Summit, September 28 – 30th, 2010, phoenix, AZ, USA.

**Han D**, Yoon Y, Li Y, Sommerfeld M and Hu Q. (2010) Cloning and Characterization of an Acyl-CoA:Glycerol-3-Phosphate Acyltransferase in *Chlamydomonas reinhardtii*. In 4th Annual Algae Biomass Summit, September 28 – 30th, 2010, phoenix, AZ, USA.

**Yoon K**, Han D, Li Y, Sommerfeld M and Hu Q (2010) Identification and Functional Analysis of Phospholipid:Diacylglycerol Acyltransferase, a Putative Enzyme Involved in Triacylglycerol Synthesis in *Chlamydomonas reinhardtii*. In 4th Annual Algae Biomass Summit, September 28 – 30th, 2010, phoenix, AZ, USA.

**Hu Q**, Yoon K, Han D, Li Y, and Sommerfeld M. (2010) Triacylglycerol synthesis in microalgae: pathways, regulation and biotechnological implications In 8<sup>th</sup> European Workshop on Biotechnology of Microalgae, 7-10 June 2010, Nuthetal, Germany.

**Li Y**, Sommerfeld M, and Hu Q, (2010) *DGAT2*, a gene encoding type-2 diacylglycerol acyltransferase, is involved in hyper-accumulation of triacylglycerol in a *Chlamydomonas reinhardtii* starchless mutant. In 14th the International Conference on the Cell and Molecular Biology of Chlamydomonas, June 6-10, 2010, Norton, Massachusetts, USA.

**Hu Q**, Li Y, Han D, Hu G, Dauvillee D, Sommerfeld M (2009) Metabolic Engineering of Microalgae for Over Production of Triacylglycerol. In 3rd Annual Algae Biomass Summit, October 7-9, 2009, San Diego, California, USA.

**Li Y**, Han D, Chen L, Sommerfeld M and Hu Q, (2009). Effects of Light Intensity and Nitrogen Availability on Photosynthetic Carbon Partitioning into Starch and Neutral Lipid in the Oleaginous Green Alga *Pseudochlorococcum* sp. In 18th Western Photosynthesis Conference, 8-11 January, 2009, Pacific Grove, California, USA.

Li Y, Wang J, Sommerfeld M, Chen F and **Hu Q**, (2006). Effects of Photon Flux Density on Carotenogenesis in *Haematococcus Pluvialis* (Chlorophyceae): Comparison between Wild Type and Astaxanthin-Overproduction Mutant. In the 60th meeting of Phycological Society of America, 6-12 July, 2006, Juneau, Alaska, USA.

Wang J, Li Y, Sommerfeld M, and **Hu Q** (2006). Cloning, identification and characterization of several superoxide dismutases (SOD) genes in *Haematococcus Pluvialis*. In the 60th meeting of Phycological Society of America, 6-12 July, 2006, Juneau, Alaska, USA.

Li Y, Wang J, Sommerfeld M, Chen F and **Hu Q** (2005). Understanding the role of astaxanthin in stress defense in *Haematococcus pluvialis* (Chlorophycean): New evidence from molecular genetic, biochemical, and physiological perspectives. In the 10th International Conference on Applied Phycology, 24 - 28 July, 2005, Kunming, China.

Wang J, Li Y, Sommerfeld M, Chen F and **Hu Q** (2005). Isoenzymes of Superoxide Dismutase in *Haematococcus pluvialis* (Chlorophyceae) under Oxidative Stress. In the 10th International Conference on Applied Phycology, 24 - 28 July, 2005, Kunming, China.

### ***Teaching and Training***

#### **A. Postdoctoral fellows supervised**

Dr. Shailendra Kumar Singh (2017-present): SERB Indo-US Postdoctoral Fellow

Dr. Yi-Ying Lee (2015-present)

Dr. Jin Liu (2012 – 2015): The 2015 awardee of “Thousand Talents Program for Distinguished Young Scholars” of China.

*Next position: Assistant Professor and Principle investigator, College of Engineering, Peking University, China.*

Dr. Sangram Lenka (2015): The 2015 awardee of the Israel government fellowship.

*Next position: Principle investigator, TERI-Deakin Nano Biotechnology Centre, TERI University, India.*

Dr. Jia Feng (2014). *Next position: Associate Professor, Shanxi University, China.*

#### **B. Graduate students supervised**

Beibei Hu, Visiting Ph.D. student from Nanchang University 2016-present

Mohamed Mahmoud-Aly Visiting Ph.D. student from Cairo University 2015- now

Zhen Zhang, Visiting Ph.D. student from East China University of Science & Technology 2013-2014

*Next position: Ph.D. student at East China University of Science & Technology*

Yao Wang, Visiting Ph.D. student from Jinan University 2013-2014

*Next position: Ph.D. student at Jinan Univ.*

#### **C. Graduate student thesis committees**

Samuel Major	M.S	UMCES (MEES)	2015 – present
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Daniel Fucich	Ph.D.	UMCES (MEES)	2015 – present
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Rudy Park	Ph.D.	UMBC	2014 – present
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Wipawee Dejtisakdi	Ph.D.	UMBC	2013 – 2014
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#### **D. Teaching**

Marine and Environmental Biotechnology, MEES 698T, 4 credits, Spring 2017 (co-lecturer; led by Dr. Sook Chung)

Algae, Biodiversity, and Bioenergy, MEES 708U, 2 credits, Fall 2016 (lead lecturer; co-taught with Dr. Tsvetan Bachvaroff)

Marine and Environmental Biotechnology, MEES 698T, 4 credits, Spring 2016 (co-lecturer)

Marine and Environmental Biotechnology, MEES 698T, 4 credits, Spring 2015 (co-lecturer)

E. Interns, undergraduate and high school students

Charles Newcomb	UMBC	2016
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*Next position: Associate at Biotech industry*

Chiamaka Nnah*	Univ. of Maryland Eastern Shore	2016
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Jennifer Rilling*	University of Delaware	2015
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Manuel Saldaña*	University of Puerto Rico	2014
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Stephanie Stookey*	UMBC	2013
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Andre Chen	Marriotts Ridge High School, MD	2013-2014
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Christine Zhang	Dougherty Valley High School, CA	2013
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*\*Minority student interns from the Living Marine Resources Cooperative Science Center (LMRCSC) program.*

***Services***

A. Journals Peer Review

Applied and Environmental Microbiology, Aquatic Biosystems, Algal Research, Applied Microbiology and Biotechnology, Biotechnology and Bioengineering, Bioresource Technology, Biotechnology and Biofuels, Biofuels, Environmental Progress & Sustainable Energy, Extremophiles, Journal of Applied Phycology, Journal of Phycology, Journal of Industrial Microbiology & Biotechnology, Journal of renewable energy, Lipids, New Biotechnology, Process Biochemistry, Phycologia, Scientific research, and Talanta

B. International Agencies (as an *ad hoc* reviewer)

2016 German Academic Exchange Service Postdoctoral Researchers International Mobility Experience Program

2016 Netherlands Organisation for Scientific Research Building Blocks of Life Grant Program

2011 the Israeli Ministry of Science, Israeli Ministry of Science and Technology Infrastructure program

C. Federal and State Government (as a panelist or *ad hoc* reviewer)

2017 NSF CBET Energy for Sustainability program panelist

2016 NOAA Saltonstall-Kennedy Competitive Research Program



2015 USDA National Institute of Food and Agriculture SBIR program  
2014 NSF Catalysis and Biocatalysis program panelist  
2013 NOAA Saltonstall Kennedy (2013 S-K) program  
2012 NSF Catalysis and Biocatalysis program panelist  
2012 Iowa NASA Experimental Program to Stimulate Competitive Research  
2011 Delaware Sea Grant College Program  
2010 DOE Office of Science Graduate Fellowship (DOE-SCGF) Program  
2010 Contributing author of the DOE National Algae Biofuel Technology Roadmap

#### D. University System of Maryland and IMET

Member of the UMCES graduate faculty council (2016- present)

IMET seminar chair (2015-present); host 6 speakers in 2015 and 13 speakers in 2016

Co-Founder of Maryland Microbial Biotechnology Club (2013-present); arrange monthly meetings with 11 labs from University System of Maryland and two labs from Johns Hopkins University

Member of the UMCES-IMET Programs Coordinator search committee (2016)

Discussion lead on the IMET strategic plan “Energy, Climate Change & Global Health” section (2016)

Committee member for renovation of Algae Kitchen of Aquaculture Research Center at IMET (2015).

Work Group 4 member for UMCES self-study (2014-2015)

Committee member for Dr. Tsvetan Bachvaroff’s promotion to an UMCES-IMET Research Assistant Professor appointment (2014)

Committee member for the Accountant search at UMCES-IMET office (2014)