BIOGRAPHICAL SKETCH

NAME: Zoe Hilioti

POSITION TITLE: Principal Investigator

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Aristotle University, School of Agriculture, Thessaloniki, Greece	B. S.	1991	Plant Sciences
Mediterranean Agronomic Institute of Chania, Chania, Greece	M. Sc.	1993	Horticultural Sciences/Protected crops
The Pennsylvania State University, Dept. of Horticulture, State College, PA, USA	Ph.D.	1998	Horticulture/ Plant Molecular Biology

A. Personal Statement

I was attracted to the biological process of morphogenesis that takes place at different scales ranging from single cells to whole organism and captivated by the complexity of its regulation. The research aims at achieving an integrated and systems-level approach of the mechanisms by which extracellular and intracellular cues influence morphogenesis and cell function. Studies extend to assemblages of cells (fungal biofilms), structures and whole organisms (plants). In doing so, several techniques and methodologies of molecular & cell biology, microscopy, biochemistry, genetics, genomics and computational biology are employed. Research areas of interest:

- Discovery and characterization of plant transcription factors
- Targeted genome engineering with programmable endonucleases (ZFNs)
- Characterization of metabolic profiles of genome-engineered plants and plants that display natural genetic variation for selection of high value-added crops
- Effect of phytochemicals on fungi and plants
- Valorization of residual biomass in form of biochar into crop production
- Archaeobotany

Our present emphasis is on crop plants. The growing use of plants to produce food, fiber and biofuels represents a significant challenge for the agricultural sector in terms of breeding targets. To improve plants for food and energy in a climate smart way targeted horizontal technologies are used in the lab. Climate change and global warming have negative impact on plant growth and productivity due to drought and more drought-tolerant plants are needed to offset the consequences of climate change. Among vegetables, tomato is adapted to drought conditions and is suitable for production in most latitudes. Among non-edible oilseeds, castor bean is most

adapted to drought conditions with its deep root system while castor oil can be used in numerous valuable by-products including aviation fuels, high-grade lubricants, paints, protective coverings, printing inks, cosmetics and pharmaceuticals. The research links all levels of biological organization and evaluates metabolic and phenotypic changes because of genetic variation within the system. At another level, targeted genetic perturbation makes it possible to generate local variation in a given genetic background to create useful phenotypes for basic and applied research.

B. Positions and Honors

Pre and Postdoctoral positions and Professional experience:

9/2010: Principal Investigator, Systems biology lab, Institute of Applied Biosciences, Thessaloniki, Greece

3/2010-7/2010: Lecturer, 'General Microbiology', Technological Educational Institute of Eastern Macedonia and Thrace, School of Agricultural Technology, Department of Oenology and Beverage Technology, Drama, Greece

2004-6/2009: Assistant Research Scientist, with Dr. Andre Levchenko, Systems biology of MAPK signaling,
Dept. of Biomedical Engineering, Johns Hopkins University, USA

2001-2004: Postdoctoral Research, with Dr. Kyle Cunningham, Systems biology of calcium/calcineurin signaling, Dept. of Biology, Johns Hopkins University, MD, USA

1999-2001: Postdoctoral Fellow, cell cycle regulation, with Dr. Orna Cohen-Fix, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases, LMCB, MD, USA

25/7-14/8 2000: Teaching assistant, 'Yeast Genetics' Course, Cold Spring Harbor Laboratory, New York, NY, USA

1994-1998: Graduate Student, ‘Post-pollination responses in *Pelargonium* x*hortorum*’, Dr. Kathleen Brown, Dept. of Horticulture, the Pennsylvania State University, State College, PA, USA

1996-98: Teaching Assistant, Dept. of Horticulture, the Pennsylvania State University, State College, PA, USA.

Graduate courses: i) Post-harvest Physiology (with Prof. Kathleen Brown), ii) Experimental design (with Prof. Richard Craig), iii) Undergraduate course: Horticultural Systematics (with Prof. Richard Craig)

1991-1993: M.Sc. Fellow, ‘Effect of long days and gibberellic acid application on four carnation (*Dianthus caryophyllus* L.) cultivars’, Chania, Greece

6/1992: Lecturer, ‘Design of parks and nurseries in the city of Chania’, Chania, Greece

Awards, Honors, Grants

1991-1993: M.Sc. Fellow, Mediterranean Agronomic Institute of Chania, Chania, Greece

1994-97**:** Recipient of Advanced Research Scholarship in 'Floriculture', Greek State of Scholarship Foundation (I.K.Y), Athens, Greece

1995**:** Gerondelis Foundation Award for Excellence in Research, MA, USA

1996-98**:** Fellowship Award, The Pennsylvania State University, Dept. of Horticulture, State College, PA, USA

1996**:** "The Honor Society of Horticulture" Pi Alpha Xi, USA

1998**:** "The Women in Science and Engineering (WISE) award, USA

1999-2001**:** Visiting fellowship, National Institutes of Health, NIDDK, Bethesda, MD, USA

2008**:** Travel award for an oral presentation in 6th International Conference on Pathways, Networks, and Systems, Chania, Greece

2008**:** Travel award from Japanese government for an oral presentation in workshop "Systems Biology of MAPK pathways", Institute of Science and Technology, Okinawa, Japan

2011**:** Fellowship award for an oral presentation in EMBO/EMBL Symposium "Structure and Dynamics of Protein Networks", Heidelberg, Germany

2013: Travel grant for participation in 7th EPSO Conference 'Plants for a Greening Economy', Porto Heli, Greece

C. Contributions to Science (basic and applied)

***Genome editing in plants*:**

1. Miladinović D, Antunes D, Yıldırım K, Bakhsh A, Cvejić S, Kondić-Špika A, Marjanović Jeromela A, Opsahl Sorteberg HG, Zambounis A, **Hilioti Z**, 2021. Targeted plant improvement through genome editing: From lab to field. Plant Cell Reports 40, 935–951. https://doi.org/10.1007/s00299-020-02655-4

2. **Hilioti Z**, 2018: Non-transgenic Approach to Deliver ZFNs in Seeds for Targeted Genome Engineering. In: Liu J. (eds) Zinc Finger Proteins. Methods Mol Biol, vol 1867. Humana Press, New York, NY. doi: https://DOI.org/10.1007/978-1-4939-8799-3_14. ISBN: 978-1-4939-8798-6

3. Gago, C., Drosou, V., Paschalidis, K., Guerreiro, A., Miguel, G., Antunes, D., **Hilioti, Z**, 2017. Targeted gene disruption coupled with metabolic screen approach to uncover the *LEAFY COTYLEDON1-LIKE4* (*L1L4*) function in tomato fruit metabolism. Plant Cell Reports 36: 1065-1082. DOI 10.10007/s00299-017-2137-9. **http://rdcu.be/qTif.**

3. **Hilioti Z,** Ganopoulos I, Ajith S, Bossis I, Tsaftaris A, 2016: A novel arrangement of zinc finger nuclease system for in vivo targeted genome engineering: the tomato LEC1-LIKE4 gene case. Plant Cell Reports: 1-15. DOI: 10.1007/s00299-016-2031-x. **http://rdcu.be/nlhu.**

Phytochemicals and their effects on fungi:

1. Sytar, O.; Kotta, K.; Valasiadis, D.; Kosyan, A.; Brestic, M.; Koidou, V.; Papadopoulou, E.; Kroustalaki, M.; Emmanouilidou, C.; Pashalidis, A.; Avdikos, I.; **Hilioti, Z**, 2021. The Effects of Photosensitizing Dyes Fagopyrin and Hypericin on Planktonic Growth and Multicellular Life in Budding Yeast. *Molecules*, *26*, 4708. https://doi.org/10.3390/molecules26164708

2. Zambounis, A., Sytar. O., Valasiadis, D., **Hilioti, Z**, 2020: Effect of photosensitizers on growth and morphology of Phytophthora citrophthora coupled with leaf bioassays in pear seedlings. Plant Protection Science 56: 74-82. https://doi.org/10.17221/102/2019-PPS

Plant Gnosophysiology

Michmizos D**, Hilioti Z**, 2019. A roadmap towards a functional paradigm for learning & memory in plants.
Journal of Plant Physiology 232:209-215, ISSN 0176-1617,
https://doi.org/10.1016/j.jplph.2018.11.002

Plant OMICS technologies

1. Tsaballa, A., Sarrou, E., Xanthopoulou, A., Tsaliki, E, Kissoudis, C., Karagiannis, E., Michailidis, M., Martens, S., Sperdouli, E., **Hilioti, Z**., Fotopoulos, V., Nianiou-Obeidat, I., Tsaftaris, A., Madesis, P., Kalivas, A., Ganopoulos, I:, 2020. Comprehensive approaches reveal key transcripts and metabolites highlighting metabolic diversity among three oriental tobacco varieties. Industrial Crops and Products, 143, 111933. DOI: 10.1016/j.indcrop.2019.111933

2. Zambounis, A., Ganopoulos, I., Aravanopoulos, F., **Hilioti, Z**., Madesis, P., Molassiotis, A., Tsaftaris, A., Xanthopoulou, A.2020. Genomics Opportunities and Breeding Strategies towards Improvement of Climate-smart Traits and Disease Resistance against Pathogens in Sweet Cherry. In: Kole C (ed) Genomic Designing of Climate-Smart Fruit Crops. Springer, Cham, Swirzerland, ISBN 978-3-319-97946-5.

Signaling regulation and systems biology:

1**. Hilioti Z**, Sabbagh W Jr, Paliwal S, Bergmann A, Goncalves M, Bardwell L and Levchenko A, 2008. Oscillatory phosphorylation of yeast Fus3 MAPK kinase controls periodic gene expression and morphogenesis. Current Biology 18, pp. 1700-6. 10.1016/j.cub.2008.09.027.

2. Paliwal S, Iglesias PA, Campbell KJ, **Hilioti Z**, Groisman A and Levchenko A, 2007. MAPK mediated transcriptional regulation leads to bimodal gene expression and adaptive gradient sensing in yeast pheromone pathway. Nature 446 (7131), pp. 46-51. DOI: 10.1038/nature05561.

3. **Hilioti Z**, Gallagher DA, Low-Nam ST, et al., 2004. GSK-3 kinases enhance calcineurin signaling by phosphorylation of RCNs. Genes Dev 18(1):35-47. DOI:10.1101/gad.1159204.

Cell process regulation:

1. Rajawat YS, **Hilioti Z**, Bossis I, 2011. Retinoic Acid induces autophagosome maturation through redistribution of the cation-independent mannose-6-phosphate receptor. Antioxidants and Redox Signalling 14, pp. 2165-2177. DOI: 10.1089/ars.2010.3491

2. Rajawat Y, **Hilioti Z**, Bossis I, 2010. Autophagy: A target for retinoic acids. Autophagy 6(8), pp. 1224-1226. DOI: 10.4161/auto.6.8.13793

3. **Hilioti Z**, Chung YS, Moshizuki Y, Hardy CF and Cohen-Fix O, 2001. The anaphase inhibitor Pds1 binds to the APC/C-associated protein Cdc20 in a destruction box dependent manner. Current Biology 11(17), pp. 1347-1352. DOI: 10.1016/s0960-9822(01)00399-2

Development of immunotherapy technology:

1. Pejawar-Gaddy S, Rajawat Y, **Hilioti Z**, Xue J, Gaddy DF, Finn OJ, Viscidi RP, Bossis I, 2010. Generation of a tumor vaccine candidate based on conjugation of a MUC1 peptide to polyionic papillomavirus virus-like particles. Cancer Immunology, Immunotherapy. 59, pp. 1685-1696. DOI: 10.1007/s00262-010-0895-0

Characterization of high-order transcription regulators:

1. **Hilioti Z**, Ganopoulos I, Bossis I, Tsaftaris A, 2014. LEC1-LIKE paralog transcription factor: how to survive extinction and fit in NF-Y protein complex. Gene 543: 220-233.

2. Drosou V, Kapazoglou A, Koidou V, Merkouropoulos G, **Hilioti Z**, 2017: Spatial and temporal expression of cytosine-5 DNA methyltransferase and DNA demethylase gene families of the Ricinus communis during seed development and drought stress. Plant Growth Regulation 2017. DOI: 10.1007/s10725-10017-10323-y. http://rdcu.be/vRRq.

Breeding elite plants:

1. Merkouropoulos G, **Hilioti Z**, Abraham EA, Lazaridou M, 2017. Evaluation of *Lotus corniculatus* L. accessions from different locations at different altitudes reveals phenotypic and genetic diversity. Grass and forage science 72 (4), 851-856 DOI: 10.1111/gfs.12279

2. Merkouropoulos G, Kapazoglou A, Drosou V, Jacobs E, Krolzig A, Papadopoulos C, **Hilioti Z**, 2016. Dwarf hybrids of the bioenergy crop *Ricinus communis* suitable for mechanized harvesting reveal differences in morpho-physiological characteristics and seed metabolic profiles. Euphytica 2016; 1-13.DOI 10.1007/s10681-016-1702-6.

D. Additional Information

Reviewer: Plant Molecular Biology Reporter, Planta, British Biotechnology Journal, BMC Genomics, Journal of Crop Science, Journal of Biotechnology Letters, International Journal of Vegetable Science, The Scientific Pages of Horticulture, Journal of Plant Biochemistry and Biotechnology, Plant Growth Regulation Journal, Emerging Topics in Life Sciences, Environmental Monitoring and Assessment

2011: ‘Applied Research & Innovation Competition’ launched by Eurobank EFG and SEV Hellenic Federation of Enterprises

2013: Registry of Experts of the Special Management and Implementation Service in the areas of Research, Technological Development and Innovation as evaluator / certifier

2014: Member of the Evaluation Committee for the Czech/Norway research grants

Participation in research networks:

2019-2023: National representative of Greece in the Management Committee of COST ACTION CA18111 ’Genome editing in plants-a technology with transformative potential’

2012-2015: National representative of Greece in the Management Committee of COST FA1106: ‘An integrated systems approach to determine the developmental mechanisms controlling fleshy fruit quality in tomato and grapevine’

2012: UBIOCHEM-III: ’Sustainable production of fuels/energy, materials and chemicals from biomass’

2012: DIBANET: ‘Diesel miscible fuels from wastes, residues and non-food crops of Latin America & Europe’

Professional Memberships: Geotechnical Chamber of Greece (GEOTEE), Hellenic Society for Biological Sciences (EEBE)

Publicity related to Research:

- Development of the first ZFN technology in tomato using a novel ZFN design:
  http://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=14806

  https://us.makemefeed.com/2016/09/28/zinc-finger-nuclease-system-developed-for-targeted-genome-engineering-in-tomato-2676758.html

  https://sciencetrends.com/tailoring-tomatoes-to-match-individual-consumer-needs/

- Sustainable agricultural practices in tomato and castor bean (application of biochar as soil amendment)
  https://advanceseng.com/general-engineering/castor-plant-derived-biochars-effects-soil-amendments-seedlings/

  https://sciencetrends.com/properties-of-biochar-derived-from-castor-plants/

  https://www.lasciences.com/proprietes-du-biochar-derive-des-plantes-de-ricin

  https://www.wissenature.com/eigenschaften-von-biokohle-abgeleitet-von-castor-plants