MOHAMMED ALI WEDYAN

curriculum vitae

Professor of Biology (Biogeochemistry)
The Hashemite University
Department of Biology and Biotechnology
The Hashemite University
Zarqa – JORDAN
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Education:

Liverpool University, UK

Ph.D. in Oceanography, *July 2005.*

Supervisor: Prof Martin Preston.

Thesis: "***Amino acids in the atmospheric and marine environments: distributions and the influence of chiral characteristics***.". Thesis Committee: Martin Preston (Advisor, Liverpool University) Prof. George Wolff, (Liverpool University. Head of Department), Dr. Mark Fitzsimons (Plymouth University).

Al albyat University. Jordan

MSc degree. Biology, June 2000.

Supervisor: Prof. Ihsan Mahasneh

Thesis: "***Phenotypic characterization of blue green algae under salinity stress****."*

Jordan University of Sciences and Technology, Jordan

BSc degree of Applied Biology, June 1996**.**

Employment and Research Experience:

The Hashemite University, Department of Biology and Biotechnology

Full Professor, *4/9 /2019- ……*

Head of Department ,*10/9/2015 -1/9/2016*

Associate Professor*, 1/9/2013 – 4/9 /2019*

Served as PI on 73000 *JD HU-Granted (73000 JD) 2015-2017.). (Bioavailability of Dissolved Organic Nitrogen in Rain Water)*

examined how much of the DON in aerosol collected over the Hashemite university, Zarqa, is potentially available for use by phytoplankton and the potential effect of aerosol DON on phytoplankton production.

Al Hussein bin Talal University, Dept. of Biology.

Assistant Professor*, July. 2005 - April. 2011.*

Head of Department ,*10/9/2007 -1/9/2009.*

Associate Professor *May. 2011 – September 2013.*

Served as PI on 120000 JD in grants ***(Red Sea and Dead Sea Ecology)****.*

carried out research in relationship between nutrients and cycling of organic nitrogen and other organic compound in the environment and I was also interested in understanding the distribution of dissolved

organic carbon, nitrogen and phosphorus in the seawater, and also in investigating the ecological effect of the **red sea** water transfer to the **dead sea** water.

*Served as Co - PI on 110000JD in grants **(Red Sea Pollutions).***

Carried out an experimental to address the correlations between Hg and organic matter in sediment and seawater.

Max-Plank Institution research group in Marine biogeochemistry, Oldenburg University Oldenburg, Germany.

***Visiting Scholar**, June 2010 – August 2010.*

Carried out an experimental and modeling study of new technique to detect the trace concentration of dissolved organic matter in the different environmental samples.

Stanford University, Biological department, Palo Alto, USA

***Visiting Scholar** September-october . 2006*

Collaborated on microbial metabolism data analysis and other projects with host group.

Environmental School, Liverpool University, Liverpool, UK

***Ph.D. Student (Marine Sciences)** , 2002 - 2005.*

Advisor: Prof. Martin Preston

1. I was researching the transport and effect of organic pollutant on the surface seawater particularly organic nitrogen, using the overland flow system. This research was conducted as part of AMT research.
2. The investigations are geared towards understanding the "black box" of mass balance regarding nitrogen, phosphorous and carbon in the input and run-off from the over the Atlantic Ocean. This requires wide-ranging environmental knowledge regarding the issues of discharge and consent, agricultural practice, farming attitudes and public perception, as well as the technical laboratory skills and capacity for self-motivated fieldwork.

Teaching Experience

AHU Department of Biology,

1. Marine & Environmental biochemistry (Biology, Undergraduate Course).
2. Bioorganic Pollution (Biology, Undergraduate Course)
3. Environmental Biotechnology (Biology, Undergraduate Course)
4. General Biology 1&2 (Biology , Undergraduate Course)
5. Practical general Biology 1&2 (Biology, Undergraduate Course).
6. Special topics (Global environmental issues) (Biology, Undergraduate Course).
7. Ecology (Biology, Undergraduate Course).
8. Marine Sciences, Introduction (Biology, Undergraduate Course).
9. Biochemistry (Biology, Undergraduate Course).
10. Practical Biochemistry (Biology , Undergraduate Course),

HU Department of biology and biotechnology

1. General Biology 1&2 (Biology, Undergraduate Course)
2. Ecology (Biology, Undergraduate Course)
3. Marine Biology (Biology, Undergraduate Course)
4. Molecular Ecology of communities and Populations (Biology, graduate Course)

5. Environmental Biotechnology (Biology, graduate Course)
6. Advance Biochemistry (Biology , graduate Course),
7. Biochemistry (Biology, Undergraduate Course).

Editorial board of Advances in Environmental Biology, from 2008-till now.

American-Eurasian Network for Scientific Information (AENSI Publisher)

Research Interests

1. Understanding the relationship between nitrogen fixation and export production.
2. Determining the distribution and elemental stoichiometry of dissolved organic carbon, nitrogen and phosphorus in the Gulf of Aqaba.
3. Factors influencing the transfer of both pollutant and naturally occurring organic molecules from terrestrial to marine environments including atmospheric and coastal systems the Gulf of Aqaba.
4. Some additional interests in aquatic nutrient dynamics.

Past Grants

1. Effect of Organic nitrogen on the Phytoplankton, in the Gulf of Aqaba. AHU- Granted (2500JD) 2005-2007.
2. Gut content analysis and in situ grazing experiments of selected species of copepod. AHU- Granted (2500JD) 2006-2008.
3. Speciation analysis of organometallic and inorganic compounds of mercury in water, fish and sediments of Gulf of Aqaba, Jordan. Scientific Research Support Fund-Granted (108.400 JD) 2008- 2010.
4. The Dead Sea Ecosystem as influenced by Red Sea-Dead Sea conduit project Scientific Research Support Fund –Granted (117100JD). 2009-2012.

Current Grants

1. Dissolved Organic Nitrogen in Water Environment, HU-Granted (73000 JD) 2015-2017.
2. Springs of life in a “Dead Sea”. Submitted to DFG collaborated with MPI- Bremen, marine microbiology group.

MSc students supervised

1. Ahmed al harahsh, Identification and characterization of dissolved organic nitrogen in wastewater plants, Jordan, (2015).
2. Tahreer Hamdan, Study the bioavailability of dissolved nucleic acids (D-NA's) in freshwater environment. (2017)
3. Bilal Abu Hanieh, Biochemical characterization of amino acids and fatty acids extracted from olive westwater collected from different areas of north Jordan.(2016).
4. Lina abu mharib, Assessment of contaminations in drinking water in dulil region in Jordan . (2017)
5. Hassan Al Jouarneh, Amino acids profiling of diabetes mellitus(DM) patients in north Jordan, (2019)
6. Ichraq Al Masloub , Association Between Leptin Hormone and Thyroid Hormone Levels in Jordanian Hypothyroidism patients . (2019)

MSc. Internal examiner in examination committee

1. Doaa Budier, The antinociceptive and anti-inflammatory activities of Alcea Setosa Extract. (2015)
2. Ahmed Alatshan,The antinociceptive and anti-infliammtory effect of anastatica heirochuntica extracts in animal models. (2015)
3. Hia Mashgiah, Larval Trematodes in physa Snail in Jordan. (2016)

4. Elham Al Zud, Biological Activity and Apoptosis Signaling Pathway for Cephalostatin 1 analogues. (2016)

Invited Seminars

1. Seminar, Department of biology, Al Hussein University, Maan, Jordan, Apr. 2007.
2. Seminar, Department of Chemistry and biology, Oldenburg University, Germany, Aug. 2010.
3. Seminar, Laboratory for Microbial environment, Environmental Institute, Stanford University, Oct. 2006.

Professional Association Memberships

1. 02/2007- Present. Member of Jordan Badia Research and Development Center
2. 05/ 2007- Present . Member of The National Center for Biotechnology
3. 2006- Present. Member of the Global Network for Environmental Science and Technology.
4. 2005- Present. Member of Challenger Society for Marine Science, UK

Languages

1. Fluent in English
2. Native Arabic speaker

Chapters in books

1. Abdel Rahman Tawaha, Swapnil Ganesh Sanmukh, Eduard Torrents, Nusrat Jahan, **Moh'd Ali Wedyan**, Ali M. Qaisi, Abdelrazzaq Al-Tawaha.2020. ***Algal Viruses. (edit): L.P. Awasthi, Applied Plant Virology, Elsevier 2020.***
2. Abdel Rahman M. Al- Tawaha, Ezz Al-Dein Al-Ramamneh, Muhammad Aasim, Canan Sevinc, Abdel Razzaq Al- Tawaha, Yousef M Abu-Zaitoon, Mohammad Alhawatema, Ali M. Qaisi Amanullah, Imran, Nusrat Jahan**,** **Moh'd Ali Wedyan**, Munir Turk1, Abdur Rauf, Shah Khalid, Mohd Abas Shah, Rokayya Sami, Devarajan Thangadurai, Jeyabalan Sangeetha, Wafa'a A. Al-Taisan1, Shah Fahad. **Plant-microbe interaction under climate change.** In: Shah Fahad, Mirza Hasanuzzaman, Mukhtar Alam, Hidayat Ullah, Muhammad Saeed, Imtiaz Ali Khan, and Muhammad Adnan. ***Environment, Climate, Plant and Vegetation Growth, Springer, Netherlands, (submitted)***
3. Abdel Rahman M. Al- Tawaha, Harpreet Kaur Cheema, Marwa M. El-Deriny, Dina S. S. Ibrahim, Mazen A. Atayal, Huma Naz, Abdel Razzaq Al- Tawaha, Ali M. Qaisi, Amanullah, Imran, Abdur Rauf, Shah Khalid, Mohd Abas Shah, Ekaterina Kozuharova, Devarajan Thangadurai, Jeyabalan Sangeetha, Shah Fahad, **Moh'd Ali Wedyan,** Sonia Sheoran, Pradeep Sharma, Garima Singroh, Wafa'a A. Al-Taisan, Yousef M Abu-Zaitoon. **Biological control**. In: Shah Fahad, Mirza Hasanuzzaman, Mukhtar Alam, Hidayat Ullah, Muhammad Saeed, Imtiaz Ali Khan, and Muhammad Adnan***. Environment, Climate, Plant and Vegetation Growth, Springer, Netherlands, (submitted)***

Journal Publications Peer-Review

1. **Wedyan, M.** and Preston, M.R., 2005. Isomer-selective adsorption of amino acids by components of natural sediments. *Environmental science & technology*, *39*(7), pp.2115-2119.
2. **Wedyan, M.A.** and Fandi, K., 2007. Soluble organic nitrogen in the marine aerosol over the Gulf of Aqaba (Jordan). *Journal of Applied Sciences Research*, *3*(8), pp.787-790.
3. **Wedyan, M.A**., Fandi, K.G. and Al-Rousan, S., 2007. Bioavailability of atmospheric dissolved organic nitrogen in the marine aerosol over the Gulf of Aqaba. *Aust J Basic*, *1*(3), pp.208-212.
4. **Wedyan, M.A**. and Preston, M.R., 2008. The coupling of surface seawater organic nitrogen and the marine aerosol as inferred from enantiomer-specific amino acid analysis. *Atmospheric Environment*, *42*(37), pp.8698-8705.

5. Karatas, A., **Wedyan, M**., Sozen, M., Shehab, A., & Amr, Z. 2008. Karyotypes of bats (chiroptera: Rhinolophidae, vespertilionidae) from Jordan. Arab Gulf Journal oJ'Scientific Research,26 (4): 193- 198.
6. Tarawneh, K.A., **Wedyan, M.A.,** Al-zou'bi, M., Khleifat, K.M. and Tarawneh, A., 2008. Isolation and characterization of halophilic bacteria from the dead sea coast, Jordan. *Adv Environ Biol*, *2*(2), pp.63-9.
7. Khleifat, K.M., Tarawneh, K.A., **Wedyan, M.A**., Al-Tarawneh, A.A. and Al Sharafa, K., 2008. Growth kinetics and toxicity of Enterobacter cloacae grown on linear alkylbenzene sulfonate as sole carbon source. *Current microbiology*, *57*(4), pp.364-370.
8. Tarawneh, K.A., Khleifat, K.M., AlMustafal, A., Aliouil, N. and **Wedyan, M.A.,** 2008. Temporal expression of Neurospora crassa tyrosinase gene under the control of glucoserepresible gene-1 (Grg-1) promoter. *Aust. J. Basic and Appl. Sci*, *2*, pp.805-814.
9. Tarawneh, K.A., Khleifat, K.M., AlMustafal, A., Aliouil, N. and **Wedyan, M.A.,** 2008. Temporal expression of Neurospora crassa tyrosinase gene under the control of glucoserepresible gene-1 (Grg-1) promoter. *Aust. J. Basic and Appl. Sci*, *2*, pp.805-814.
10. Khleifat, K.M., Tarawneh, K.A., **Wedyan, M.A**., Al-Tarawneh, A.A. and Al Sharafa, K., 2008. Growth kinetics and toxicity of Enterobacter cloacae grown on linear alkylbenzene sulfonate as sole carbon source. *Current microbiology*, *57*(4), pp.364-370.
11. **Wedyan, M**., Altaif, K. and Aladaileh, S., 2009. Heavy metals in wet deposition of South of Jordan. *Europian Journal of Science and Research*, *36*, pp.554-560.
12. **Wedyan, M**. and Altaif, K., 2009. Distribution of dissolved nucleic acids in the soil of southern Jordan. *Transylvanian Review of Systematical and Ecological Research*, (8), p.65.
13. Khleifat, K.M., Halasah, R.A., Tarawneh, K.A., Halasah, Z., Shawabkeh, R. and **Wedyan, M.A.,** 2010. Biodegradation of linear alkylbenzene sulfonate by Burkholderia sp.: Effect of some growth conditions. *Int J Agr Biol*, *12*, pp.17-25.
14. **Wedyan, M.A.,** Ababneh, F.A. and Al-Rousan, S., 2012. The correlations between mercury speciation and dissolved organic matter in the sediment of the Red Sea. *American Journal of Environmental Sciences*, *8*(4), pp.403-411.
15. **Wedyan, M.**, El-Oqlah, A., Altif, K., & Khlifate, K. 2013. The Dead Sea Ecosystem Influenced by Red Sea–Dead Sea Conduit Project (Peace Conduit). *Transylvanian Review of Systematical and Ecological Research*, *15*(2), 45-60.
16. **Wedyan, M.A.,** 2014. Characterization of dissolved organic nitrogen (DON) in rainwater of Qassim, Saudi Arabia. *World Journal of Applied Sciences and Research*, *3*(2), pp.1-7.
17. Abuiraq, L., Kanan, G., **Wedyan, M**. and El-Wahl, A., 2015. Efficacy of extracts of some lichens for potential antibacterial activity. *Research journal of pharmaceutical biological and chemical sciences*, *6*(1), pp.318-331.
18. **Wedyan, M**., Harahsheh, A. and Qnaisb, E. 2016. Determination of the Fate of Dissolved Organic Nitrogen in the Three Wastewater Treatment Plants, Jordan *International Journal of Environmental and Science Education*, 11(5), pp. 767-777.
19. Qnais, E., Bseiso, Y., **Wedyan, M**., Al-Omari, M., & Alkhateeb, H. 2016. Chemical composition and antinociceptive effects of essential oil from aerial parts of Gundelia tournefortii L Asteraceae (Compositae) in rats. *Tropical Journal of Pharmaceutical Research*, *15*(10), 2183-2190.
20. Ismail, Y., **Wedyan, M.,** Al-zuabe, M., Abderrahman, S., Lee, J.H., Kim, S., Kim, S.K., Han, S.B., Lee, J.W., Gallaher, J.R. and Grudziak, J., 2016. Screening methods to determine antibacterial activity of natural products. *Research Journal of Medicinal Plants*, *10*(8), pp.181-189.

21. **Wedyan,** M., Al Harahsheh, A., Muhaidat, R., Bsoul, E. and Qnais, E., 2016. Cd and Fe Concentrations of the Surface Water of a Stream in Jordan. *Polish Journal of Environmental Studies*, *25*(6), pp.2617-2521.
22. Al-Tawaha, A.R., Turk, M.A., Abu-Zaitoon, Y.M., Aladaileh, S.H., Al-Rawashdeh, I.M., Alnaimat, S., Al-Tawaha, A.R.M., Alu'datt, M.H. and **Wedyan, M.,** 2017. Plants adaptation to drought environment. *Bulgarian Journal of Agricultural Science*, *23*(3), pp.381-388.
23. **Wedyan, M**., Qnais, E., Ismail, Y. And Al Tawaha, A.R., 2017. The molecular composition of dissolved free amino acids in rainwater. *Bulgarian Journal of Agricultural Science*, *23*(6), pp.1004-1010.
24. **Wedyan, M.,** Hanieh, B.A. and Al Harahsheh, A., 2017. Chemical Characterization of Olive Pomace in the Northern Region of Jordan. *Bulgarian Journal of Agricultural Science, 23 (No 5) 2017, 866–872*
25. Qnais, E., Bseiso, Y., **Wedyan, M.** and Alkhateeb, H., 2017. Evaluation of Analgesic Activity of the Methanol Extract from the Leaves of Arum palaestinum in Mice and Rats. *Biomedical & Pharmacology Journal*, *10*(3), p.1159.
26. Qnais, E., Modallal, N., Bseiso, Y., **Wedyan, M**., & Alkhateeb, H. 2017. Evaluation of the antinociceptive effects of the essential oil from aerial parts of anastatica hierochuntica in experimental models. *Evaluation*, *3*, 112-122.
27. Dahamsheh, A. and **Wedyan, M.,** 2017. Evaluation and assessment of performance of Al-Hussein bin Talal University (AHU) wastewater treatment plants. *International Journal of Advanced and Applied Sciences*, *4*(1), pp.84-89.
28. Al-Tawaha, A.R., Turk, M.A., Al-Tawaha, A.R.M., Alu'datt, M.H., **Wedyan, M.**, Al-Ramamneh, E.A.D.M. and Hoang, A.T., 2018. Using chitosan to improve growth of maize cultivars under salinity conditions. *Bulg J Agric Sci*, *24*(3), pp.437-442.
29. Al-Tawaha, A.R., Al-Tawaha, A.R., Alu'datt, M., Al-Ghzawi, A.L., **Wedyan, M**., Al-Obaidy, S.D.A. and Al-Ramamneh, E.A.D., 2018. Effects of soil type and rainwater harvesting treatments in the growth, productivity and morphological trains of barley plants cultivated in semi-arid environment. *Australian Journal of Crop Science*, *12*(6), p.975.
30. Dahamsheh, A., **Wedyan**, M. and Alhasanat, M.B., 2018. Climate change impact assessment on rainwater in Jordan. *International Journal Of Advanced And Applied Sciences*, *5*(1), pp.148-155.
31. Alatshan, A., Qnais, E., **Wedyan, M.**, Bseiso, Y., Alzyoud, E., Banat, R. and Alkhateeb, H., 2018. Antinociceptive and Antiinflammatory Activities of Anastatica hierochuntica and Possible Mechanism of Action. *Indian Journal of Pharmaceutical Sciences*, *80*(4), pp.637-646.
32. Qnais, E., Bseiso, Y., Kayed, K., **Wedyan, M.** and Alkhateeb, H., 2018. Analgesic effect of quercetin 3, 7-o-dimethyl ether isolated from salvia officinalis. Pharmacologyonline 2:64-73
33. **Wedyan, M.A**., Qnais, E., Altaif, K. and Al-Tawaha, A., 2019. Characteristics of dissolved organic nitrogen in municipal and biological nitrogen removal wastewater treatment plants in jordan. *Transylvanian Review of Systematical and Ecological Research*, *21*(2), pp.1-12.

Conference Articles

1. Wedyan M, and Preston M. 2nd International Conference on Environmental Science and Technology . Houston, USA. 19-22 August 2006
2. El-oqlah, A. and Wedyan, M. A. Plant biodiversity in mountainous cost of Dead Sa area (Jordan) , Mountains of the world- Ecology, Conservation and Sustainable Development , Muscat, Sultanate of Oman. 10-14 February 2008.

Unpublished Research Reports

1. Wedyan, M ; Fandi, K and Al Najjar, M (2007) Gut content analysis and in situ grazing experiments of selected species of copepod. AHU- Granted (2500JD)
2. Ababneh, F and Wedyan, M (2011) Speciation analysis of organometallic and inorganic compounds of mercury in water, fish and sediments of Gulf of Aqaba, Jordan. SRF-Granted (108.400 JD)
3. Wedyan, M ; Altif, K; Eleogla, A and Khlifate, K (2012) The Dead Sea Ecosystem as influenced by Red Sea-Dead Sea conduit project. SRF-Granted (117.100JD).

References

Upon request

SUMMARY OF STATEMENT OF LEADERSHIP, MANAGEMENT, TEACHING, AND RESEARCH PHILOSOPHY

Leadership Philosophy

My leadership characteristics are strategic-oriented, team-oriented, and results-oriented. I feel during a clear and open approach. I lead by carrying people together around a transparent vision articulated during a comprehensive proposal. I plan to be an innovative leader who takes full advantage of the chances obtainable but will also work inside resource limitations and catch methods to make improvement towards the strategic goals of the department. My decision making process for resource allocation is predicated on strategic priorities. My leadership style combines high expectations, support for skilled development and growth, and celebration of accomplishments. My approach to leadership has been within the service to others. I serve the department. It is satisfying to me to assist others succeed. I actually have followed these values during my administrative career.

Management Philosophy

My management vogue is to guide rather than manage. My general management philosophy is to surround myself with the most effective attainable individuals, and empower them with the authority and freedom to create choices and reach their positions. I will invariably support the selections my colleagues create, and can handle any disagreements over a decision in private. As a manager, I am typically characterized as a realistic problem solver and practical thinker. I am a firm believer that the best decisions are made by discussing with the people around us, who must be able to offer critical feedback without fear of retaliation. I do have high expectations concerning to performance and expect that people take concern for their actions, as well as myself. I maintain an open-door sort of management and an informal, however effective, main office atmosphere. I am a transparent, direct individual, and a good listener. I work effectively with people, as well as with small and large teams. These approaches need trust and open lines of communication at all times. I actually have followed these principles throughout my administrative career.

Philosophy of Teaching

It is my belief that learning is most effective when it can be made personal. A student learns better when the approach most closely matches his learning style. A student more readily assumes responsibility for his learning when he is involved in doing something personally meaningful. A student's effort increases when he sees the personal benefits that come from his hard work.

I am also firmly convinced that active construction of some artifact, be it physical or virtual, is a necessary part of making the learning personal. Too often students are asked to learn in chunks that have only tenuous links from one to another. Engaging in the construction of an artifact allows students to observe the relationships in the knowledge that they are gaining and it allows them to freely structure that knowledge in ways that are most appropriate for them.

My experience has been that one of the least productive ways to foster learning and knowledge construction is to lecture to students. I feel that the role of a teacher is to help students connect with the material by whatever means the students have chosen. While this is made more difficult as class sizes increase, it is far from impossible. My role as a teacher is to provide my students with the resources and the support they need to most effectively take advantage of those resources. By engaging students in discussions and by guiding their reflection on the process, I can move away from the role of authority and move into the role of collaborator.

I want my students to learn what it means to be members and practitioners of the professional discipline of Biogeochemistry. I want them to be able to view the subjects they are taking as part of a coherent whole and to be able to apply what they have learned in new situations. I want them to know where the discipline has come from and where it is going. I want them to understand their responsibility to society for the technologies that they create. I want them to understand the role that biogeochemistry plays in other academic disciplines and in the daily lives of people. I want them to respect and value the opinions and ideas of others. I want them to experience aha! moments as often as possible. I want them to leave classes wondering where the time went. I want them to be able to articulate their knowledge and fill the teacher role when called upon.

I strive to understand the needs and goals of each of my students and to tailor my teaching to them. I strive to treat my students with respect, to be generous when acknowledging their accomplishments, and gentle when they fall short. I strive to have empathy for my students and to understand the difficulties that they are having. I strive to avoid complacency by challenging my own opinions and beliefs. I strive to put forth my best effort on behalf of my students.

I try to infuse my teaching with the genuine fascination and enthusiasm that I have for biochemistry. I try to keep the atmosphere in my classrooms warm and light, even when the material is difficult. I encourage discussions and the debate of new ideas. I expect students to contribute material from their own experiences. I prefer to use term length projects as a vehicle for knowledge construction and assessment rather than disconnected assignments and exams. I try to lecture only when the amount and type of material that needs to be covered dictates it. I encourage students to come to office hours to discuss difficulties that they might be having, to express concerns or offer suggestions about the material or methods, or just to talk. And most of all, I continue to learn about the discipline, about teaching, and about the students.

Research Statement

Motivation. Research in an academic environment provides a unique opportunity to solve problems and vision the technology of the future. My primary research focus is nutrient biogeochemistry, with emphasis on sources of nitrogen to phytoplankton in the open ocean, and the inextricable relationship between nutrients and cycling of nitrogen in the marine environment. I am also interested in understanding the distribution of dissolved organic nitrogen in the coastal and open ocean

Research Philosophy. I do believe that a strong understanding of the problem is extremely important. There are numerous fields related to marine sciences that produced a great body of work that could be applied to field and provide insights on how to improve existing understanding and design new approaches. While related areas of science may strive for extreme accuracy, the ultimate test of marine sciences is plausibility and predictability and rarely accuracy. A big part of my early research work in amino acids in the atmospheric and marine environments: distributions and the influence of chiral characteristics, trying to understand the nature of it and design a model that would either simulate the problem or solve it using biochemical techniques. While this approach has often provided satisfactory solution it still yielded methods that were still hard to use and slow. Understanding the problem and gaining insights has allowed me to made approximations that were more user friendly and faster to marine environment without sacrificing visual quality.

Summary of Research Interests

Previous Work. Firstly, My main focus of research on atmospheric deposition which is now well recognized as a major source of both inorganic and organic nitrogen for many aquatic ecosystems. Until now approximately 70-90% of the dissolved organic nitrogen (DON) fraction of aerosols has remained uncharacterized. In my research we studied D and L amino acids were determined in urban and remote Atlantic aerosol samples and surface sea water using HPLC. Aerosol samples were collected from the Liverpool Campus, the Taiwan Port and from the Atlantic Ocean during the Atlantic Meridional Transect AMT12, 13, 14 cruises. Dissolved free amino acids (DFAA), dissolved hydrolysable amino acids (DHAA), and particulate amino acids (PAA) were determined in each sample. The peptidoglycan derived D- enantiomer of aspartic acid (D-Asp), glutamic acid (D-Glu), serine (D-Ser), and alanine (D-Ala) were found in significant amounts in all dissolved and suspended aerosol samples. Plant derived D-enantiomers of leucine (D-Leu) and isoleucine (D-Ile) were found mainly in the Liverpool samples whilst the signature of bacterial content was notably higher in marine samples. The contribution of bacterially-derived compounds to the DON pool was assessed, using amino acid enantiomeric (D/L) ratios. The results also indicated a significant bacterial input to DON. The distribution of D-amino acids in the samples suggested a potential, additional input from other sources; plant materials and terrestrial substances. This work is the first direct and complete quantification of D-amino acids in dissolved and particulate components of the atmosphere and provides molecular evidence for microbial and higher plant contribution to the organic nitrogen content of the atmospheric aerosol. Secondly, I focused on the sources and contribution of soluble organic nitrogen (SON) in aerosols over the Gulf of Aqaba–Jordan to understand its impact on the marine ecosystem. The results revealed that the SON contribution to the total soluble nitrogen (TSN) in aerosols to be around 15%. The inclusion of SON dry deposition in the N budget significantly increases the N nutrient input the Gulf of Aqaba marine ecosystem. This work is the first direct quantification of organic N in dissolved form of the atmosphere provides molecular evidence for contributions to the organic nitrogen content of the atmospheric aerosol. Finally, Atmospheric dissolved organic nitrogen (DON) has recently gained attention as a significant additional source of new N loading to the sea. Utilization of DON aerosol source by costal phytoplankton was examined in short-time scale (0-12 day) in the Gulf of Aqaba. The proportion of DON utilized ranged from 29-43%. Although phytoplankton production generally increased with aerosol DON addition, the increased production was not correlated ($r^2=0.79$) with amount of DON utilized suggesting that a variable portion of dissolved organic matter was directly or indirectly available to the phytoplankton. The effect of atmospheric N on marine productivity depends on the biological availability not on the amount of deposition of both inorganic and organic N. Event base measurements for coastal Gulf of Aqaba showed that about 80% of atmospheric deposition N was organic N. These results indicate that atmospheric DON in aerosol could be an important source N to the Gulf of Aqaba.

Future Directions. I would like to explore a broad range of topics both within traditional scientific visualization as well as interdisciplinary areas that improve efficiency, quality and effectiveness of depiction while exploiting fields ranging from marine sciences to psychology and perception. I briefly outline some types of research I would like to pursue.

I) The Dead Sea Ecosystem as influenced by Red Sea-Dead Sea conduit project

The Dead Sea presents fascinating challenges to the biologist who attempts to understand the biological processes and the limits of life in one of the most extreme environments on Earth. The Dead Sea is a terminal desert lake, its waters contain around 340 g /l of salts, and the brine has a pH of about 6. During the 20th century, the Dead Sea level has dropped by more than 20 m, and during the past decade, the level has dropped approximately 1 m per year on the average (Gavrieli & Oren, 2004, Gavrieli et al., 2002). This drop in water level is causing severe problems to local infrastructure, tourism, and industrial activities.A thorough understanding of the biological phenomena in the Dead Sea and the factors that determine the nature and extent of biological blooms in the lake is of great importance when planning human interference in the properties of the lake. Since the peace treaty between Israel and Jordan was established in 1994, a proposal for the construction of a ''Peace Conduit'' between the Gulf of Aqaba (Red Sea) and the Dead Sea is being investigated. This planned water carrier is intended to counteract the drop in Dead Sea water level and the drying out of the lake and to restore the water level to a desired elevation. Thereafter, inflow will be controlled so that it will compensate for evaporation. The difference in elevation between the Red Sea and the Dead Sea (current surface level: -419 m) may be exploited for energy generation and seawater desalination (Gavrieli et al., 2005; Oren et al., 2004; Oren et al., 2005). Future implementation of the plans to construct the ''Peace Conduit'' requires careful planning based on an in-depth understanding of all possible positive and negative effects. Biological phenomena are among the factors to be taken into account. This project is intending to provide answer to the basic question does the transport of seawater affects the Dead Sea ecosystem.

II) Speciation analysis of organometallic and inorganic compounds of mercury in water, fish and sediments of Gulf of Aqaba, Jordan

Determine the current status of the aquatic environment of the Gulf of Aqaba with respect to mercury accumulation, as well as to examine the possible age trends and size differences in the accumulation of methyl mercury in fish from the study area. This will provide us with the partial answer to our big question about the safety of our sea food as well as the environmental health of the gulf.

III) Identification and characterization of dissolved organic nitrogen in wastewater plants, Jordan.

This research aimed to assess the composition of total dissolved nitrogen (TDN) species, particularly dissolved organic nitrogen (DON), over the traditional wastewater treatment operations in three biological nutrient removal (BNR) wastewater treatment plants (WWTPs) in Jordan. It had been found that the DON percentage was up to 30% of TDN within the effluent plant; which restricted the plant's ability to eliminate nitrogen to minimal amounts. Effluent DON levels from the three plants varied from 11.7 to 34.8 mg N/L and would not fluctuate substantially, even if there seemed to be a substantial difference inside influent organic nitrogen levels. The main transforming of DON and biodegradable dissolved organic nitrogen (BDON) along the treatment train had been noticed in the aerobic method. More than 70% of effluent DON was consisting of hydrophilic materials, which promote algal growth. The research presented significant information for foreseeable future improving of WWTPs or the choice of DON elimination techniques to satisfy additional challenging nitrogen release limits.

IV) Study the bioavailability of dissolved nucleic acids (D-NA's) in freshwater environment.

The results of our study provide insight into the nitrogen percentage of D-DNA and changing the DNA concentration; show that there is a variety of dissolved nucleic acid concentration among different seasons which increased in the summer regardless algal occurring or not. Dissolved nitrogen increased with increasing the dissolved DNA in freshwater environment of the two dams. In general D-DNA concentration and dissolved nitrogen percentage increased where the phytoplankton occurs in aquatic environments.