

## **Dr MUSTAFA MOKRECH**

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### **PROFESSIONAL PROFILE**

Mustafa's background is in Geographic Information Systems (GIS) and remote sensing. He has developed and taught courses in Geomatic Engineering at the undergraduate and graduate levels. His researches focus on spatial modeling considering an interdisciplinary approach for analyzing and understanding future environmental and socio-economic implications. He has applied spatial modeling in various fields including coastal management and adaptation to future changes, impact assessment of climate change on urban and natural environments, hydrological and watershed analysis, terrain analysis, and uncertainty management in GIS-based models. His current research activities also include capturing, processing and analyzing remote sensing data using Unmanned Aerial Vehicles and side scanning sonar systems. Mustafa is currently serving as a senior research scientist at the Environmental Institute of Houston, University of Houston-Clear Lake; investigating changes in landscape use and demographics and impacts on the local environment. He is also serving as a lecturer at the School of Science and Computer Engineering (SCE); teaching applied GIS and spatial analysis.

### **EDUCATION**

- PhD** in GIS and Remote Sensing (1996-2001)  
King's College, University of London
- M.Sc.** in Surveying (1993-1995)  
Faculty of Engineering, Cairo University
- B.Sc.** in Civil Engineering, Aleppo University (1981-1986)

### **PROFESSIONAL EXPERIENCE**

- SENIOR RESEACH SCIENTIST and LECTURER** (August 2010 – Now)  
Environmental Institute of Houston  
University of Houston – Clear Lake  
Texas, USA
- SENIOR RESEARCH FELLOW**  
School of Civil Engineering and the Environment  
University of Southampton  
Southampton, UK
- ASSISTANT PROFESSOR**  
Department of Geography  
UAE University  
Al Ain, UAE
- POST-DOCTORAL RESEARCH FELLOW**  
Department of Geography,  
King's College, University of London  
London, UK
- TEACHING ASSISTANT**  
Faculty of Civil Engineering  
Aleppo University  
Aleppo, Syria

## TEACHING

### Undergraduate Level

1. Geographic Information systems
2. Applied GIS
3. Principles of remote sensing
4. Remote sensing: digital image processing
5. Surveying
6. Principles of cartography
7. Digital cartography
8. Photogeology

### Graduate Level

1. Advanced GIS
2. GIS for environmental applications
3. GIS for coastal engineers

### Supervision of Graduate Students

Topics include the following:

- Impact assessment of sea-level rise on the Iranian coastal area: regional to local investigation
- Environmental implications on coastal wetlands in Galveston Bay considering changes in urban landscape and sea-level rise
- Investigating the implications of sea-level rise and urban planning on coastal wetlands in the Galveston Bay area using the SLAMM habitat model and the 2040 Houston urban projection.
- Investigating potential options for mitigating the impact of sea-level rise on coastal wetland losses.
- Outcome driven approach for assessing the environmental impact of sea-level rise in North Norfolk, UK

### SELECTED RESEARCH INVOLVEMNTS

1. Mapping shallow reefs using low-cost side scanning sonar and drone photography systems: this project is funded by the Gulf Coast Prairies.
2. Harris County Texas Comprehensive Turbidity Study. This project investigates changes in turbidity due to the increase in sediment, nutrients and other pollutants that are caused by construction activities associated with new urban development.
3. Time of Travel Study at the Mason Park. This research project evaluates the treatment efficiency of the Mason Park treatment wetlands in terms of indicator bacteria and other related pollutants. It investigates the hydraulic residence and transit time of stormwater within the Mason Park Constructed Wetland System.
4. CLIMSAVE - Climate Change Integrated Assessment Methodology for Cross-sectoral Adaptation and Vulnerability in Europe. This project developed and applied an integrated methodology for stakeholder-led, climate change impact and vulnerability assessment that explicitly evaluates regional and continental scale adaptation options ([www.CLIMSAVE.eu](http://www.CLIMSAVE.eu)). This research project was completed in October 2013.
5. Coast Program in phase 2 of the Tyndall Centre for Climate Change Research. The objective of this research project was to construct an integrated regional coastal simulator in East Anglia, United Kingdom. The coastal simulator is a GIS based tool that allows the

integration of climate change scenarios and policy response options with information on sediment transport, biodiversity, sea defenses and socio-economic activities.

6. RegIS2. This project developed a meta-model tool for regional integrated climate change for assessing impacts, adaptation to impacts and policy responses of climate change.

7. Regional Assessment of Coastal Flood Risk. This project established a tiered framework for coastal flood risk assessment.

8. Influence of Climate Change on the Erosion of Beaches and Cliffs. This project aimed at modeling shoreline changes and sediment sources and sinks to provide new information about the mobility of sediment on East Anglian beaches (United Kingdom), sea-level and management scenarios.

9. The BRANCH projec. This project focused on modeling habitat loss and developing a GIS-based Archive.

10. A research project on analyzing future implications of climate change and sea-level rise in Mombasa, Kenya.

## SELECTED PUBLICATIONS

### PEER REVIEWED

**Mokrech, M.**, Kebede, A.S., Nicholls, R.J. and Wimmer, F. (2015). An integrated approach for assessing flood impacts due to future climate and socio-economic conditions and the scope of adaptation in Europe, *Climatic Change*, Vol 128, 3, 245-260

Kebede, A.S., Dunford, R., **Mokrech, M.**, Audsley, E., Harrison, P.A., Holman, I.P., Nicholls, R.J., Rounsevell, M.D.A., Sallaba, F., Sanchez, A., and Wimmer, F. (2015). The sensitivity of cross-sectoral impacts of climate and socio-economic drivers on key European sectors, *Climatic Change*, Vol 128, 3, 261-277.

**Mokrech, M.**, Nicholls, R.J., and Dawson, R. J. (2012) Scenarios of future built environment for impact assessment of climate change using a multi-criteria approach in GIS. *Environment & Planning B: Planning & Design*. Vol. 30, 120-136.

Kebede, A.S., Nicholls, R.J., Hanson, S., and **Mokrech, M.** (2012). Impacts of Climate Change and Sea-Level Rise: A Preliminary Case Study of Mombasa, Kenya. *Journal of Coastal Research*. Vol. 28, 1A, 8-19.

**Mokrech M.**, Hanson S, Nicholls R. J., Wolf J, Walkden M.J.A., Fontaine C, Nicholson-Cole S, Jude S.R., Leake J, Stansby P K, Watkinson A R, Rounsevell M.D.A., Lowe J. A., Hall J.W. (2011) "The Tyndall coastal simulator." *Journal of Coastal Conservation*. 15:325-335

**Mokrech, M.**, Nicholls, R.J., Gardiner, S., Jude S. and Berry, P. (accepted) Integrating Geomorphic, Habitat and Species Change Simulations into Geographic Information Systems: the BRANCH Coastal Archive, *Journal of Coastal Research*.

Dawson, R. J., Dickson, M. E., Nicholls, R. J., Hall, J. W., Walkden, M. J. A., Stansby, P., **Mokrech, M.**, Richards, J., Zhou, J., Milligan, J., Jordan, A., Pearson, S., Rees, J., Bates, P., Koukoulas, S., Watkinson, A. (2009) Integrated analysis of risks of coastal flooding and cliff erosion under scenarios of long term change, *Climatic Change*, 95, 249-288

***This publication is awarded the Lloyds science of risk prize for 2012.***

**Mokrech, M.**, Nicholls, R.J., Richards, J., Henriques, C., Holman, I.P. and Shackley, S. (2008) Regional impact assessment of flooding under future climate and socio-economic scenarios in East Anglia and North West, England, UK, *Climatic Change*, Volume 90, 31 - 55

Richards, J.A., **Mokrech, M.**, Berry, P.M. and Nicholls, R.J. (2008) Climate change and floodplain ecosystems: regional assessment and adaptation potential, *Climatic Change*, Volume 90, 141 - 167

Holman, I.P., Rounsevell, M.D.A., Cojocar, G., Shackley, S., McLachlan, C., Audsley, E., Berry, P.M., Fontaine, C., Harrison, P.A., Henriques, C., **Mokrech, M.**, Nicholls, R.J., Pearn, K.R. and Richards, J.A. (2008) The concepts and development of a participatory regional integrated assessment tool. *Climatic Change*, Volume 90, 5 – 30

**Mokrech, M.**, Nicholls, R.J., Richards, J., Watkinson, A., J., Jude, S., Milligan, J., Hall, J., Walkden, M., Stansby, P., Wright, J., Rounsevell, M., Fontaine, C., Acosta-Michlik', L., Lowe, J. and Wolf, J. (2007) The Development of an Integrated Coastal Simulator for Supporting Long Term Coastal Management. *Int. Conf. on Coastal Management*, Cardiff, pp. 203-217.

Leake, J., Wolf, J., Lowe, J., Stansby, P., Jacoub, G., Nicholls, R., **Mokrech, M.**, Nicholson-Cole, S., Walkden, M., Watkinson, A. and Hanson, S. (2007) Integrated Modeling for Coastal Impacts. *Proceedings 10th International Conference on Estuarine and Coastal Modelling, November 2007, Newport, Rhode Island*. ASCE. New York.

Leake, J., Wolf, J., Lowe, J., Stansby, P., Jacoub, G., Nicholls, R., **Mokrech, M.**, Nicholson-Cole, S., Walkden, M., Watkinson, A., and Hanson, S. (2008) Predicted Wave Climate for the UK: Towards an Integrated Model of Coastal Impacts of Climate Change. *Estuarine and Coastal Modeling (2007)*: pp. 393-406. DOI: 10.1061/40990(324)24

Nicholls, R.J., Hanson, S., **Mokrech, M.**, Stansby, P., Chini, N., Walkden, M., Dawson, R., Roche, N., Hall, J., Nicholson-Cole, S., Watkinson, A., Jude, S., Lowe, J., Wolf, J., Leake, J., Rounsevell, M., Fontaine, C. and Acosta-Michlik, L. (2009) The Tyndall coastal simulator and interface. In, McKee Smith, Jane (ed.) *Coastal Engineering: Proceedings of the 31st International Conference*. *Coastal Engineering 2008: 31st International Conference on Coastal Engineering* London, UK, World Scientific, 4341-4353. (doi:10.1142/9789814277426\_0360).

## CHAPTERS IN BOOKS

**Mustafa Mokrech**, Sarah Gardiner, Robert J. Nicholls, Andrew R. Watkinson and William J. Sutherland (2015). Coastal wetland habitats: future challenges and potential solutions. In *Broad Scale Coastal Simulation: New Techniques to Understand and Manage Shorelines in the Third Millennium*. R. J. Nicholls, R. J. Dawson and S. A. Day. Springer. ISBN 978-94-007-5258-0.

**Mustafa Mokrech**, Robert J. Nicholls, Sophie Day, Richard J. Dawson, Simon Jude and Sotirios Koukoulas (2015). GIS platforms for managing, accessing and integrating model results: The Tyndall Coastal Simulator experience. In *Broad Scale Coastal Simulation: New Techniques to Understand and Manage Shorelines in the Third Millennium*. R. J. Nicholls, R. J. Dawson and S. A. Day. Springer. ISBN 978-94-007-5258-0.

Corentin M. Fontaine, **Mustafa Mokrech** and Mark D.A. Rounsevell (2015). Land use dynamics & coastal management. In *Broad Scale Coastal Simulation: New Techniques to Understand and Manage Shorelines in the Third Millennium*. R. J. Nicholls, R. J. Dawson and S. A. Day. Springer. ISBN 978-94-007-5258-0.

Simon Jude, **Mustafa Mokrech**, Mike Walkden, James Thomas and Sotiris Koukoulas (2015). Visualising potential coastal change: communicating results using visualisation techniques. In *Broad Scale Coastal Simulation: New Techniques to Understand and Manage Shorelines in the Third Millennium*. R. J. Nicholls, R. J. Dawson and S. A. Day. Springer. ISBN 978-94-007-5258-0.

**Mokrech, M.**, Kebede, A.S., Nicholls, R.J. (In Press.) Assessing flood impacts, wetland change and adaptation in Europe: the CLIMSAVE approach. *Environmental modeling with stakeholders: Theory, Methods and Applications*. Editors: Gray, S.A., Paolisso, M.J., Gray, S.R.J. and R.C. Jordan.

## CONFERENCE PUBLICATIONS AND REPORTS

Guillen, G., **Mokrech, M.**, Oakley, J., Shepard, M., Vale, K., (2012). Time of travel study at the Mason Park. Final report prepared in cooperation with the Harris County Flood Control District. Project ID: Z100-00-00-Y053. Report # 12-002.

Guillen, G., **Mokrech, M.**, Oakley, J., Shepard, M., Vale, K., Moss, A., (2012). Harris County Texas Comprehensive Turbidity Study Results Report. Final report prepared in cooperation with the Harris County Flood Control District Project ID: Z100-00-00-Y053

**Mokrech, M.**, Nicholls, R.J., Richards, J., Watkinson, A., J., Jude, S., Milligan, J., Hall, J., Walkden, M., Stansby, P., Wright, J., Rounsevell, M., Fontaine, C., Acosta-Michlik', L., Lowe, J. and Wolf, J., (2007). A Coastal Simulator for Supporting Long Term Coastal Management, CoastGIS 2007, Santander, Spain.

Holman, I.P., Berry, P.M., **Mokrech, M.**, Richards, J.A., Audsley, E., Harrison, P.A., Rounsevell, M.D.A., Nicholls, R.J., Shackley, S. and Henriques, C., (2007). Simulating the effects of future climate and socio-economic change in east Anglia and North West England: the RegIS2 project. Summary report, Oxford, GB, UK Climate Impacts Programme, 24pp.

**Mokrech, M.**, Nicholls, R.J., Richards, J., Henriques, C., Holman, I.P. and Shackley, S., (2005). Regional Impact Assessment of Flooding under Future Climate Change and Socio-economic Scenarios in East Anglia and North West, England, UK. In Holman I.P. and de Vries T.T. (eds.) Development of a metamodel tool for regional integrated climate change management (RegIS2), Final Report of Defra project No. CC0362. pp36-56.

Koukoulas, S., Nicholls, R.J., Dickson, M.E, Walkden, M., Hall, J.W, Pearson, S.G, **Mokrech, M.** and Richard, J., (2005). A GIS tool for analysis and interpretation of coastal erosion model outputs (SCAPEGIS). In, Coastal Dynamics 2005. 5th International Conference on Coastal Dynamics Virginia, USA, American Society of Civil Engineers.

Richards, J.A., **Mokrech, M.** & Nicholls, R.J., (2005). Regional Scale Assessments of the Impacts of Climate Change on Coastal and Fluvial Ecosystems and the Scope for Adaptation. In Holman I.P. and de Vries T.T. (eds.) Development of a metamodel tool for regional integrated climate change management (RegIS2), Final Report of Defra project No. CC0362. pp.128-152.

Holman I.P., Berry P.M., **Mokrech M.**, Richards J. A., Audsley E., Harrison P.A., Rounsevell M.D.A., Nicholls R. J., Shackley S., Henriques C, (2007). "Simulating the effects of future climate and socio-economic change in east Anglia and North West England: the RegIS2 project. Summary Report." UKCIP, Oxford 2007

Pearson, S., Rees, J., Poulton, C., Dickson, M., Walkden, M., Hall, J., Nicholls, R., **Mokrech, M.** Koukoulas, S., and Spencer, T., (2005). Towards an integrated coastal sediment dynamics and shoreline response simulator: Tyndall Centre Technical Report No. [38].

Nicholls, R.J., **Mokrech, M.**, Richards, J., Bates, P., Dawson, R., Hall, J., Walkden, M., Dickson, M., Jordan, A. and Milligan, J., (2005). Assessing coastal flood risk at specific sites and regional scales: Regional assessment of coastal flood risk: Tyndall Centre Technical Report No. [45].

**Mokrech, M.**, Drake, N and Wainwright, J (2003) Uncertainty modelling and error propagation in GIS based soil erosion model. In, GISRUUK '03, London, GB.

**Mokrech, M.**, Drake, N. and Wainwright, J. (1999) A method for estimating the uncertainty of slope from DEMs. In, Geosolutions: Integrating Our World, Vancouver, CA.

## **OTHER ACTIVITIES**

1. Served as peer reviewer for a number of journals such as climatic change, global environmental change, hydrological processes and Coastal Engineering.
2. Participated in a many workshops including the following:
  - Workshop on calibrating socio-economic parameters for an agent-based urban growth model
  - Two workshops on applying the DIVA model for the red sea region
3. Participated in many training workshops including a training workshop on the implications of climate change on ecosystem services including coastal wetlands and flood protection organized by Stanford University.
4. Involved in many admin committees including search committees for hiring research staff.

## **TECHNICAL PROFICIENCY**

- Programming: C, VB.Net and Python
- GIS and Remote Sensing Packages: ARCGIS, MAP-INFO, ERDAS IMAGINE and IDRISI