



The UpWind Special Issue

Rasmussen, Flemming

Published in:
Wind Energy

Link to article, DOI:
[10.1002/we.542](https://doi.org/10.1002/we.542)

Publication date:
2012

[Link back to DTU Orbit](#)

Citation (APA):
Rasmussen, F. (2012). The UpWind Special Issue. Wind Energy, 15(1), 1-2. DOI: 10.1002/we.542

DTU Library

Technical Information Center of Denmark

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

EDITORIAL

The UpWind Special Issue

The UpWind integrated project, co-funded by the European Commission, was a unique collaboration between 40 partners from European industry, research community, academia and government focused on a single arching theme—design issues associated with large multi-megawatt wind turbines. The vision was a bold one, i.e. to enable a paradigm shift in the perspective of the wind energy industry encompassing design issues for every aspect of future large wind turbines, including modeling tools, and covering components from design for reliability through to manufacturing to reduce costs. For all the multifaceted parts of the project to be integrated, the structure incorporated a number of scientific and technological work packages with cross-cutting work packages that combined new ideas and techniques across a range of issues (Figure 1).

In addition to the comprehensive overview of the project results that is available,¹ this special issue presents some highlights of the research and integration activities that were undertaken in more detail. We start with a paper of Sieros *et al.*,² which is one of the cornerstones of the project objectives addressing the perennial question ‘How large can wind turbines get?’ in an economic framework. The concept of UpScaling was tackled in almost all aspect of the project and is a theme running through the papers. A technology integration framework was used in Mueller *et al.*³ to examine the structural optimization of different transverse flux permanent magnet generator configurations. In the area of aerodynamics and aero-elastics, a comprehensive analysis of aero-acoustic modeling was performed in Kamruzzaman *et al.*,⁴ whereas to model the aerodynamics of a megawatt rotor with complex inflow such as shear and wake interaction, a full local blade element model implementation for an elemental stream tube in both azimuth and radial direction should be used.⁵ Another crucial issue to large turbine design—testing and modeling of materials—is reviewed in the paper of Mishnaevsky *et al.*⁶ An integrated design process for offshore support structures that takes turbine controls actively into account to enable cost-effective designs is presented in Fischer *et al.*⁷ The importance of control for multi-megawatt turbines is also illustrated in Bossanyi *et al.*⁸ Moving on from the turbines themselves to the atmosphere, a verification procedure for traceable inflow measurements using Doppler lidar is described in Gottschall *et al.*⁹ Arrays of

F1

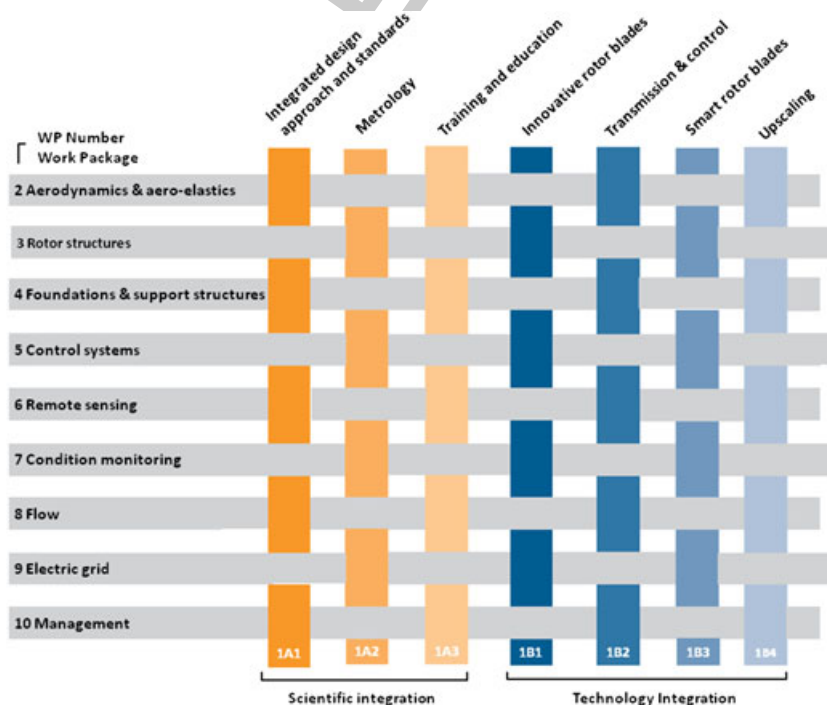


Figure 1. The structure of the European Union project UpWind (Figure redrawn from Fichaux *et al.*¹)

Color Online, B&W in Print

01 large turbines in two environments—complex terrain and offshore—are considered in the last two papers. An assessment
 02 of the state of the art of modeling wind farms in complex terrain is presented in Politis *et al.*,¹⁰ whereas Hansen *et al.*¹¹ use
 03 data from large offshore wind farms to explore the relationship between the atmospheric conditions and the power output
 04 from large offshore wind farms. Each of these papers is a major contribution to the overall thrust of the project moving wind
 05 energy forward by integrating and optimizing materials, models, tools, techniques and evaluation procedures to develop
 06 the most efficient and reliable wind turbines and wind farms.

07 We are dedicating this UpWind Special Issue to Sten T. Frandsen who was instrumental in the development of many of
 08 the scientific and technical ideas as well as the organizational structure of the project. Sadly, Sten passed away in October
 09 2010 as the project reached its successful completion. Sten spent most of his career in the Wind Energy Department at Risø
 10 National Laboratory, Denmark and was well known for his manifold contributions to wind energy research, design criteria
 11 for offshore wind turbines and development of new approaches to standards. We recognize our friend and colleague Sten
 12 T. Frandsen for his enduring legacy in wind energy research, innovation and implementation.

13 We thank all the Wind Energy editors for their help in putting together this special issue and also to Peter Hjuler Jensen
 14 of Risø DTU National Laboratory for Sustainable Energy and Jos Beurkens of the Energy Center of the Netherlands who
 15 coordinated the UpWind project.

19 REFERENCES

- 20 1. Fichaux N, Beurskens J, Jensen PH, Wilkes P. UpWind. Design limits and solutions for very
 21 large wind turbines. A 20 MW turbine is feasible, 2011. European Wind Energy Association:[http://](http://www.ewea.org/fileadmin/ewedocuments/documents/upwind/21895UpWindReportlowweb.pdf)
 22 [www.ewea.org/fileadmin/ewedocuments/documents/](http://www.ewea.org/fileadmin/ewedocuments/documents/upwind/21895UpWindReportlowweb.pdf)
 23 [upwind/21895UpWindReportlowweb.pdf](http://www.ewea.org/fileadmin/ewedocuments/documents/upwind/21895UpWindReportlowweb.pdf). Brussels. p. 108.
- 24 2. Sieros G, Chaviaropoulos P, Sorensen J, Bulder B, Jamieson P. *Wind Energy* 2011. In press.
- 25 **Q1** 3. Mueller M, Zavvos A, Bang D-J, McDonald A, Polinder H. Structural analysis & optimisation of transverse flux
 26 permanent magnet machines for direct drive wind turbines. *Wind Energy* 2011. In press.
- 27 4. Kamruzzaman M, Lutz T, Wuerz W, Shen WZ, Zhu WJ, Hansen MOL, Bertagnolio F, Madsen HA. Validations and
 28 improvements of aeroacoustic models using detailed experimental data. *Wind Energy* 2011. In press.
- 29 5. Madsen HA, Riziotis V, Zahle F, Hansen MOL, Snel H, Grasso F, Larsen TJ, Politis E, Rasmussen F. Blade ele-
 30 ment momentum modeling of inflow with shear in comparison with advanced model results. *Wind Energy* 2011. DOI:
 31 10.1002/we.493, (to appear in print).
- 32 6. Mishnaevsky Jr L, Brøndsted P, Nijssen R, Lekou DJ, Philippidis TP. Materials of large wind turbine blades: recent
 33 results in testing and modeling. *Wind Energy* 2011. DOI: 10.1002/we.470, (to appear in print).
- 34 7. Fischer T, de Vries W, Rainey P, Schmidt B, Argyriadis K, Kuehn M. Offshore Support Structure
 35 Optimization by means of Integrated Design and Controls. *Wind Energy* 2011. In press.
- 36 8. Bossanyi E, Savini B, Iribas M, Hau M, Jasniewicz B, Schlipf D, van Engelen T, Rossetti M, Carcangiu C-E, Sanchez
 37 J, Mata M. Advanced controller research for multi-MW wind turbines. *Wind Energy* 2011. In press.
- 38 9. Gottschall J, Wagner R, Courtney M, Jørgensen HE, Antoniou I. Lidar profilers in the context of wind energy—a
 39 verification procedure for traceable measurements. *Wind Energy* 2011. In press.
- 40 10. Politis E, Prospathopoulos J, Cabezón D, Hansen K, Chaviaropoulos P, Barthelmie R. Modelling wake effects in large
 41 wind farms in complex terrain: the problem, the methods and the issues. *Wind Energy* 2011. DOI: 10.1002/we.481, (to
 42 appear in print).
- 43 11. Hansen KH, Barthelmie RJ, Jensen LE, Sommer A. The impact of turbulence intensity and atmospheric stability on
 44 power deficits due to wind turbine wakes at Horns Rev wind farm. *Wind Energy* 2011. In press. WE-10-0149.

45 **Q2** Rebecca Barthelmie and Flemming Rasmussen, Guest Editors

Author Query Form

Journal: Wind Energy

Article: we_542

Dear Author,

During the copyediting of your paper, the following queries arose. Please respond to these by annotating your proofs with the necessary changes/additions.

- If you intend to annotate your proof electronically, please refer to the E-annotation guidelines.
- If you intend to annotate your proof by means of hard-copy mark-up, please refer to the proof mark-up symbols guidelines. If manually writing corrections on your proof and returning it by fax, do not write too close to the edge of the paper. Please remember that illegible mark-ups may delay publication.

Whether you opt for hard-copy or electronic annotation of your proofs, we recommend that you provide additional clarification of answers to queries by entering your answers on the query sheet, in addition to the text mark-up.

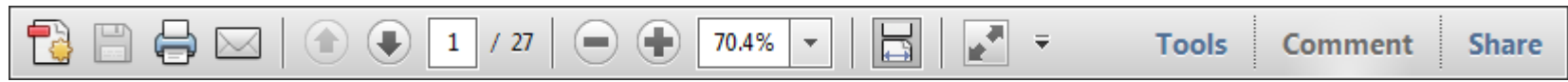
Query No.	Query	Remark
Q1	AUTHOR: If this References 2–11 has now been published in print, please add relevant volume/issue/page/year information.	
Q2	AUTHOR: Please check if authors are captured correctly.	

USING e-ANNOTATION TOOLS FOR ELECTRONIC PROOF CORRECTION

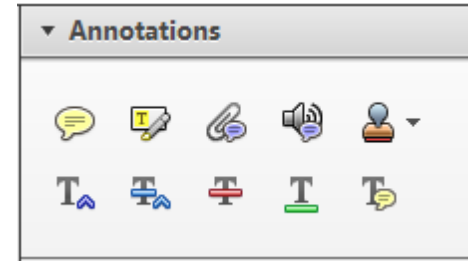
Required software to e-annotate PDFs: Adobe Acrobat Professional or Adobe Reader (version 8.0 or above). (Note that this document uses screenshots from Adobe Reader X)

The latest version of Acrobat Reader can be downloaded for free at: <http://get.adobe.com/reader/>

Once you have Acrobat Reader open on your computer, click on the [Comment](#) tab at the right of the toolbar:



This will open up a panel down the right side of the document. The majority of tools you will use for annotating your proof will be in the [Annotations](#) section, pictured opposite. We've picked out some of these tools below:



1. Replace (Ins) Tool – for replacing text.

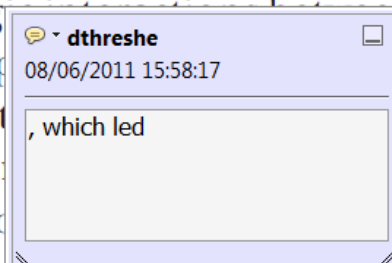


Strikes a line through text and opens up a text box where replacement text can be entered.

How to use it

- Highlight a word or sentence.
- Click on the [Replace \(Ins\)](#) icon in the Annotations section.
- Type the replacement text into the blue box that appears.

standard framework for the analysis of microeconomics. Nevertheless, it also led to the emergence of a new paradigm of strategic behaviour. The number of competitors in the industry is that the structure of the industry is a key component of the main components of the industry. At the level, are expected to be important works on the industry by Shiraz (M henceforth) we open the 'black b



2. Strikethrough (Del) Tool – for deleting text.



Strikes a red line through text that is to be deleted.

How to use it

- Highlight a word or sentence.
- Click on the [Strikethrough \(Del\)](#) icon in the Annotations section.

there is no room for extra profits and the number of competitors are zero and the number of competitors (net) values are not determined by the number of competitors. Blanchard and ~~Kiyotaki~~ (1987), perfect competition in general equilibrium. The effects of aggregate demand and supply in the classical framework assuming monopoly power. An exogenous number of firms

3. Add note to text Tool – for highlighting a section to be changed to bold or italic.



Highlights text in yellow and opens up a text box where comments can be entered.

How to use it

- Highlight the relevant section of text.
- Click on the [Add note to text](#) icon in the Annotations section.
- Type instruction on what should be changed regarding the text into the yellow box that appears.

dynamic responses of mark ups consistent with the **VAR** evidence

sation... y Ma... and... on n... to a... on... stent also with the demand-



4. Add sticky note Tool – for making notes at specific points in the text.



Marks a point in the proof where a comment needs to be highlighted.

How to use it

- Click on the [Add sticky note](#) icon in the Annotations section.
- Click at the point in the proof where the comment should be inserted.
- Type the comment into the yellow box that appears.

and supply shocks. Most of the... a... number... standard fr... cy. Nev... ole of st... ber of competitors and the imp... is that the structure of the secto



USING e-ANNOTATION TOOLS FOR ELECTRONIC PROOF CORRECTION

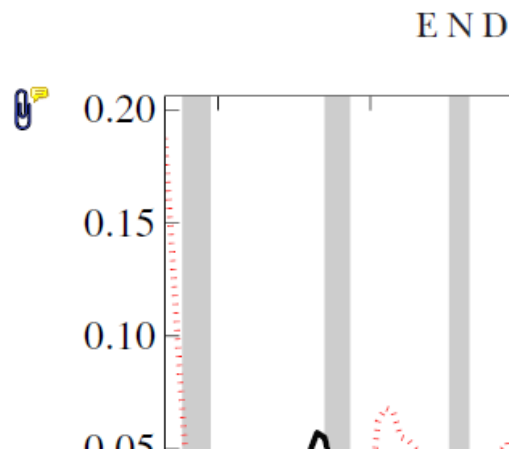
5. Attach File Tool – for inserting large amounts of text or replacement figures.



Inserts an icon linking to the attached file in the appropriate place in the text.

How to use it

- Click on the [Attach File](#) icon in the Annotations section.
- Click on the proof to where you'd like the attached file to be linked.
- Select the file to be attached from your computer or network.
- Select the colour and type of icon that will appear in the proof. Click OK.



6. Add stamp Tool – for approving a proof if no corrections are required.

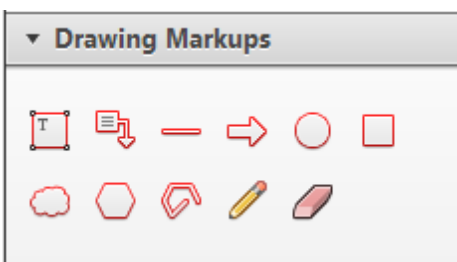


Inserts a selected stamp onto an appropriate place in the proof.

How to use it

- Click on the [Add stamp](#) icon in the Annotations section.
- Select the stamp you want to use. (The [Approved](#) stamp is usually available directly in the menu that appears).
- Click on the proof where you'd like the stamp to appear. (Where a proof is to be approved as it is, this would normally be on the first page).

of the business cycle, starting with the
 on perfect competition, constant ret
 production. In this environment goods
 extra profits and the market for marke
 he market for goods is determined by the model. The New-Key
 otaki (1987), has introduced produc
 general equilibrium models with nomin
 and market-clearing. Most of this literat

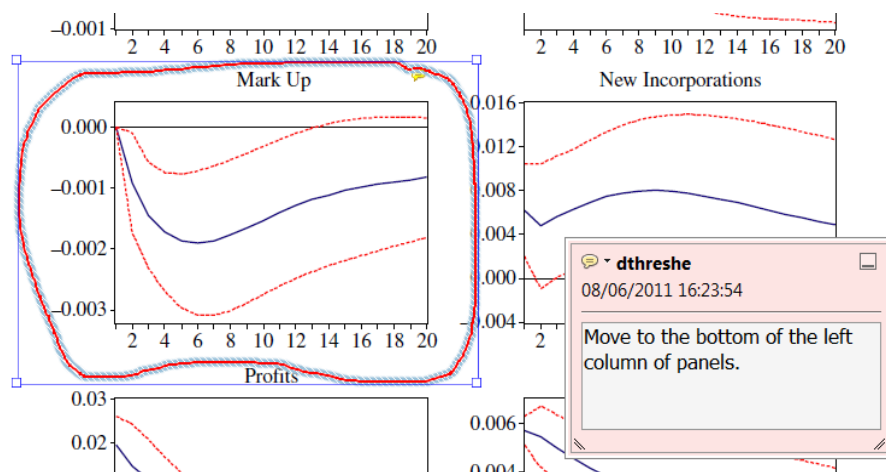


7. Drawing Markups Tools – for drawing shapes, lines and freeform annotations on proofs and commenting on these marks.

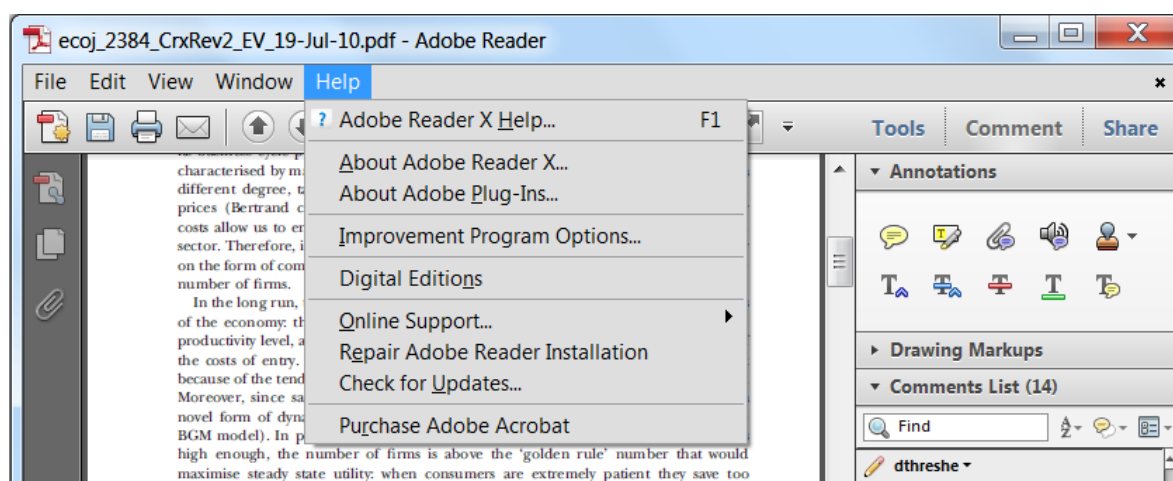
Allows shapes, lines and freeform annotations to be drawn on proofs and for comment to be made on these marks..

How to use it

- Click on one of the shapes in the [Drawing Markups](#) section.
- Click on the proof at the relevant point and draw the selected shape with the cursor.
- To add a comment to the drawn shape, move the cursor over the shape until an arrowhead appears.
- Double click on the shape and type any text in the red box that appears.



For further information on how to annotate proofs, click on the [Help](#) menu to reveal a list of further options:





WILEY AUTHOR DISCOUNT CLUB

We would like to show our appreciation to you, a highly valued contributor to Wiley's publications, by offering a **unique 25% discount** off the published price of any of our books*.

All you need to do is apply for the **Wiley Author Discount Card** by completing the attached form and returning it to us at the following address:

The Database Group (Author Club)
John Wiley & Sons Ltd
The Atrium
Southern Gate
Chichester
PO19 8SQ
UK

Alternatively, you can **register online** at www.wileyeurope.com/go/authordiscount
Please pass on details of this offer to any co-authors or fellow contributors.

After registering you will receive your Wiley Author Discount Card with a special promotion code, which you will need to quote whenever you order books direct from us.

The quickest way to order your books from us is via our European website at:

<http://www.wileyeurope.com>

Key benefits to using the site and ordering online include:

- Real-time SECURE on-line ordering
- Easy catalogue browsing
- Dedicated Author resource centre
- Opportunity to sign up for subject-orientated e-mail alerts

Alternatively, you can order direct through Customer Services at:
cs-books@wiley.co.uk, or call +44 (0)1243 843294, fax +44 (0)1243 843303

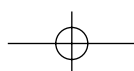
So take advantage of this great offer and return your completed form today.

Yours sincerely,

Verity Leaver
Group Marketing Manager
author@wiley.co.uk

*TERMS AND CONDITIONS

This offer is exclusive to Wiley Authors, Editors, Contributors and Editorial Board Members in acquiring books for their personal use. There must be no resale through any channel. The offer is subject to stock availability and cannot be applied retrospectively. This entitlement cannot be used in conjunction with any other special offer. Wiley reserves the right to amend the terms of the offer at any time.



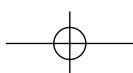
REGISTRATION FORM

For Wiley Author Club Discount Card

To enjoy your 25% discount, tell us your areas of interest and you will receive relevant catalogues or leaflets from which to select your books. Please indicate your specific subject areas below.

<p>Accounting <input type="checkbox"/></p> <p>Public <input type="checkbox"/></p> <p>Corporate <input type="checkbox"/></p> <p>Chemistry <input type="checkbox"/></p> <p>Analytical <input type="checkbox"/></p> <p>Industrial/Safety <input type="checkbox"/></p> <p>Organic <input type="checkbox"/></p> <p>Inorganic <input type="checkbox"/></p> <p>Polymer <input type="checkbox"/></p> <p>Spectroscopy <input type="checkbox"/></p> <p>Encyclopedia/Reference <input type="checkbox"/></p> <p>Business/Finance <input type="checkbox"/></p> <p>Life Sciences <input type="checkbox"/></p> <p>Medical Sciences <input type="checkbox"/></p> <p>Physical Sciences <input type="checkbox"/></p> <p>Technology <input type="checkbox"/></p> <p>Earth & Environmental Science <input type="checkbox"/></p> <p>Hospitality <input type="checkbox"/></p> <p>Genetics <input type="checkbox"/></p> <p>Bioinformatics/ Computational Biology <input type="checkbox"/></p> <p>Proteomics <input type="checkbox"/></p> <p>Genomics <input type="checkbox"/></p> <p>Gene Mapping <input type="checkbox"/></p> <p>Clinical Genetics <input type="checkbox"/></p> <p>Medical Science <input type="checkbox"/></p> <p>Cardiovascular <input type="checkbox"/></p> <p>Diabetes <input type="checkbox"/></p> <p>Endocrinology <input type="checkbox"/></p> <p>Imaging <input type="checkbox"/></p> <p>Obstetrics/Gynaecology <input type="checkbox"/></p> <p>Oncology <input type="checkbox"/></p> <p>Pharmacology <input type="checkbox"/></p> <p>Psychiatry <input type="checkbox"/></p> <p>Non-Profit <input type="checkbox"/></p>	<p>Architecture <input type="checkbox"/></p> <p>Business/Management <input type="checkbox"/></p> <p>Computer Science <input type="checkbox"/></p> <p>Database/Data Warehouse <input type="checkbox"/></p> <p>Internet Business <input type="checkbox"/></p> <p>Networking <input type="checkbox"/></p> <p>Programming/Software Development <input type="checkbox"/></p> <p>Object Technology <input type="checkbox"/></p> <p>Engineering <input type="checkbox"/></p> <p>Civil <input type="checkbox"/></p> <p>Communications Technology <input type="checkbox"/></p> <p>Electronic <input type="checkbox"/></p> <p>Environmental <input type="checkbox"/></p> <p>Industrial <input type="checkbox"/></p> <p>Mechanical <input type="checkbox"/></p> <p>Finance/Investing <input type="checkbox"/></p> <p>Economics <input type="checkbox"/></p> <p>Institutional <input type="checkbox"/></p> <p>Personal Finance <input type="checkbox"/></p> <p>Life Science <input type="checkbox"/></p> <p>Landscape Architecture <input type="checkbox"/></p> <p>Mathematics Statistics <input type="checkbox"/></p> <p>Manufacturing <input type="checkbox"/></p> <p>Materials Science <input type="checkbox"/></p> <p>Psychology <input type="checkbox"/></p> <p>Clinical <input type="checkbox"/></p> <p>Forensic <input type="checkbox"/></p> <p>Social & Personality <input type="checkbox"/></p> <p>Health & Sport <input type="checkbox"/></p> <p>Cognitive <input type="checkbox"/></p> <p>Organizational <input type="checkbox"/></p> <p>Developmental & Special Ed <input type="checkbox"/></p> <p>Child Welfare <input type="checkbox"/></p> <p>Self-Help <input type="checkbox"/></p> <p>Physics/Physical Science <input type="checkbox"/></p>
--	--

Please complete the next page /





I confirm that I am (*delete where not applicable):

a **Wiley** Book Author/Editor/Contributor* of the following book(s):

ISBN:

ISBN:

a **Wiley** Journal Editor/Contributor/Editorial Board Member* of the following journal(s):

SIGNATURE: Date:

PLEASE COMPLETE THE FOLLOWING DETAILS IN BLOCK CAPITALS:

TITLE: (e.g. Mr, Mrs, Dr) FULL NAME:

JOB TITLE (or Occupation):

DEPARTMENT:

COMPANY/INSTITUTION:

ADDRESS:

.....

TOWN/CITY:

COUNTY/STATE:

COUNTRY:

POSTCODE/ZIP CODE:

DAYTIME TEL:

FAX:

E-MAIL:

YOUR PERSONAL DATA

We, John Wiley & Sons Ltd, will use the information you have provided to fulfil your request. In addition, we would like to:

- 1. Use your information to keep you informed by post of titles and offers of interest to you and available from us or other Wiley Group companies worldwide, and may supply your details to members of the Wiley Group for this purpose. [] Please tick the box if you do **NOT** wish to receive this information
- 2. Share your information with other carefully selected companies so that they may contact you by post with details of titles and offers that may be of interest to you. [] Please tick the box if you do **NOT** wish to receive this information.

E-MAIL ALERTING SERVICE

We also offer an alerting service to our author base via e-mail, with regular special offers and competitions. If you **DO** wish to receive these, please opt in by ticking the box [].

If, at any time, you wish to stop receiving information, please contact the Database Group (databasegroup@wiley.co.uk) at John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, PO19 8SQ, UK.

TERMS & CONDITIONS

This offer is exclusive to Wiley Authors, Editors, Contributors and Editorial Board Members in acquiring books for their personal use. There should be no resale through any channel. The offer is subject to stock availability and may not be applied retrospectively. This entitlement cannot be used in conjunction with any other special offer. Wiley reserves the right to vary the terms of the offer at any time.

PLEASE RETURN THIS FORM TO:

Database Group (Author Club), John Wiley & Sons Ltd, The Atrium, Southern Gate, Chichester, PO19 8SQ, UK author@wiley.co.uk
Fax: +44 (0)1243 770154

