Prof Michael Small

Prof Michael Small

Theme Lead

Theme 2

Professor Michael Small is the CSIRO-UWA Chair of Complex Engineering Systems at The University of Western Australia. He is an applied mathematician working in the area of complex systems, dynamical systems and chaos, with a particular emphasis on the application of mathematical techniques to real-world problems.

Michael is best known for developing new paradigms for the analysis of time series data from deterministic dynamical systems – particularly in the domain of statistical hypothesis testing, data-driven model building, and using complex networks as a model of dynamical processes.

Michael has spent more than 10 years working in research within the electronic and information engineering sectors. His focus is on understanding how structure, pattern and dynamics emerge from complex systems – particularly in engineering.

Publications

- Selecting embedding delays: An overview of embedding techniques and a new method using persistent homology (...) —
  Journal Article

  ### Dr Debora Correa

  Authors: Eugene Tan, Shannon Alga, Débora Corrêa, Michael Small, Thomas Stemler and David Walker1
  2023-03-01

- A Novel Approach to Time Series Complexity via Reservoir Computing (...) —
  Conference Publishing

  ### Braden Thorne

  Authors: Braden Thorne, Thomas Jüngling , Michael Small , Debora Correa , and Ayham Zaitouny
  2022-12-07

- Reservoir time series analysis: Using the response of complex dynamical systems as a universal indicator of change (...) —
  Journal Article

  ### Braden Thorne

  Authors: Thorne, Braden Jüngling, Thomas Small, Michael Corrêa, Débora Zaitouny, Ayham
  2022-02-10

- Data-Driven Approach for Labelling Process Plant Event Data (...) —
  Journal Article

  ### Dr Debora Correa

  Authors: Débora Corrêa, Adriano Polpo, Michael Small, Shreyas Srikanth, Kylie Hollins, Melinda Hodkiewicz
  2022-01-24

- Objective Domain Boundaries Detection in New Caledonian Nickel Laterite from Spectra Using Quadrant Scan (...) —
  Journal Article

  ### Dr Ayham Zaitouny

  Authors: Zaitouny A, Ramanaidou E, Hill J, Walker DM, Small M
  2022-01-01

- Grading your models: Assessing dynamics learning of models using persistent homology (...) —
  Journal Article

  ### Dr Debora Correa

  Authors: Eugene Tan, Débora Corrêa, Thomas Stemler, Michael Small

Research Repository (

2021-12-01
- Detecting Asset Cascading Failures Using Complex Network Analysis (...) —
Journal Article

Dr Ayham Zaitouny

Authors: Jaymin Moffatt; Ayham Zaitouny; Melinda Hodkiewicz; Michael Small
2021-08-27
- Parameter extraction with reservoir computing: Nonlinear time series analysis and application to industrial maintenance (...) —
Journal Article

Braden Thorne

Authors: Thorne, B., Jüngling, T., Small, M., & Hodkiewicz, M. (2021).
2021-03-01
- Fast automatic detection of geological boundaries from multivariate log data using recurrence (...) —
Journal Article

Dr Ayham Zaitouny

Authors: Michael Small; June Hill; Irina Emelyanova; Michael Ben Clennell
2019-11-12
- Quantifying the generalization capacity of Markov models for melody prediction (...) —
Journal Article

Dr Debora Correa

Authors: Corrêa, D. C., Jüngling, T., & Small, M.,
2020-02-17
- Constrained Markov Order Surrogates (...) —
Journal Article

Dr Debora Correa

Authors: Corrêa, D. C., Moore, J. M., Jüngling, T., & Small, M.
2020-02-28
- Reconstruction of Complex Dynamical Systems from Time Series using Reservoir Computing (...) —
Journal Article

Prof Michael Small

Authors: Jüngling, T., Lymburn, T., Stemler, T., Corrêa, D., Walker, D. & Small, M.,
2019-05-01
- Quadrant scan for multi-scale transition detection (...) —
Journal Article

Dr Ayham Zaitouny

Authors: Zaitouny, A., Walker, D.M. and Small, M., 2019.

2019-10-08
- Fast automatic detection of geological boundaries from multivariate log data using recurrence. (...) —

Journal Article

Dr Ayham Zaitouny

Authors: Zaitouny, A., Small, M., Hill, J., Emelyanova, I. and Clennell, M.B., 2020. Fast automatic detection of geological boundaries from multivariate log data using recurrence. Computers & Geosciences, 135, p.104362.

2019-11-12
- Sensitization to immune checkpoint blockade through activation of a STAT1/NK axis in the tumor microenvironment (...) —

Journal Article

Dr Ayham Zaitouny

Authors: Rachael M. Zemek, Emma De Jong, Wee Loong Chin, Iona S. Schuster, Vanessa S. Fear, Thomas H. Casey, Cath Forbes, Sarah J. Dart, Connull Leslie, Ayham Zaitouny, Michael Small, Louis Boon, Alistair R. R. Forrest, Daithi O. Muiri, Mariapia A. Degli-Esposti

2019-07-17

Presentations

- Detecting transitions in dynamical and industrial systems (...) —

Prof Michael Small

Theme Lead

Theme 2
2023-09-02

- Critical Transitions in Complex Systems (...) —

Prof Michael Small

Theme Lead

Theme 2
2023-05-29

- What does the Data Say or Why I don't like analogies? (...) —

Prof Michael Small

Theme Lead

Theme 2
2022-12-08

- Learning the dynamics: from radial basis functions to reservoir computers. (...) —

Prof Michael Small

Theme Lead

Theme 2
2021-11-04

- Master Class - Deterministic Dynamics, Machine Learning & Tipping Points (...) —

Prof Michael Small

Theme Lead

Theme 2
2021-03-04

- Raising the Bar (...) —

Prof Michael Small

Theme Lead

Theme 2
2019-11-22

- ICIAM,2019, (...) —

Prof Michael Small

Theme Lead

Theme 2
2019-07-15

- SIAM 2019 (...) —

[Prof Michael Small](#)

Theme Lead

Theme 2
2019-05-20

- [International Workshop on Complex Systems and Networks](#) (...) —
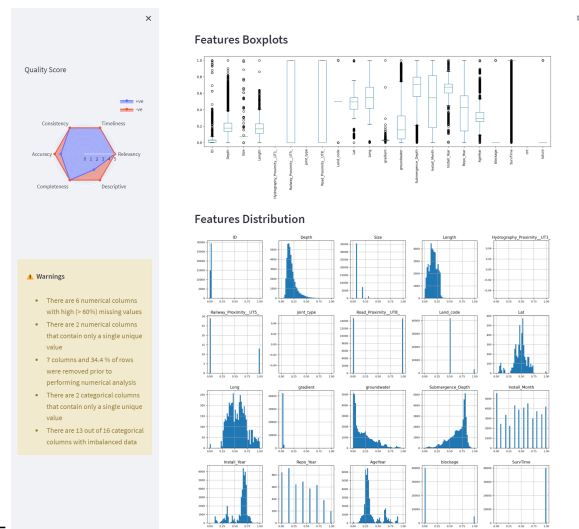

[Prof Michael Small](#)

Theme Lead

Theme 2
2019-09-24

Awards and Prizes

- [ARC Discovery Grant in the 2020 round.](#) (...)
- [National Geographic Society - AI for Earth Innovation Grant](#) (...)

Tools

- IDEA Tool (...) — 2022-07-06

Evaluate the appropriateness of data for the purposes of maintenance predictive analytics

Theme 2 Theme 5