GUY FREDERICK SUTTON

I am a data scientist, an academic, an R and Julia software developer, and an Entomologist. As a data scientist, I build software tools, and develop courses and workshops to teach statistical methods for scientific research, and how to code in R and Julia. My teaching resources are communicated across multiple platforms, including post-graduate courses, professional workshops and my blog: Stats for Scared Ecologists. My scientific work focuses on understanding plant-insect interactions and how this knowledge can be used to manage natural ecosystems.

EDUCATION

2020 | 2017

Ph.D. in Entomology
Rhodes University — Makhanda, South Africa

PROFESSIONAL EXPERIENCE

Current | 2019

Quantitative Ecologist
Rhodes University — Durban, South Africa

- Project and team management
- Design, conduct, and analyse scientific experiments
- Organise and conduct remote field surveys
- Communicate results in reports, peer-reviewed papers, and talks
- Develop teaching materials and research software
- Teach technical classes to under-graduates, post-graduates and other researchers
- Successfully write grant proposals for funding
- Recruit, supervise, and lead a team of MSc and PhD candidates

PEER-REVIEWED PAPERS

14 scientific papers, ~73 citations, h-index: 7
More details about my scientific research

2022

SPEDE-sampler: an R Shiny application to assess how methodological choices and taxon-sampling can affect Generalised Mixed Yule Coalescent (GMYC) output and interpretation
Molecular Ecology Resources **In Press, 20/01/2021**
van Steenderen, C.V.S., & **Sutton, G.F.**

2021

The alien plants that threaten South Africa's mountain ecosystems
Land 10: e1393
Canavan, K., Canavan, S., Clark, V.R., Gwate, O., Richardson, D.M., **Sutton, G.F.**, & Martin, G.D.

PERSONAL DETAILS

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Statistics Blog
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PROGRAMMING

R / tidyverse
Julia
git / GitHub

DATA ANALYSIS

Linear models (inc. GLM, GLMM)
Non-linear models (e.g. GAM)
Data visualisation (e.g. ggplot2)
Multivariate analyses (e.g. MDS, PCA, multivariate GLM)
Bayesian regression (INLA, MCMC, Turing)
Spatial and spatio-temporal modelling (e.g. R-INLA)
Occupancy and mixture models
Simulation

LITERATE CODING

R markdown / markup
blogdown / bookdown / pagedown
xaringan
distill
Continuous integration (e.g. Github actions)
Package development (in R and Julia)
Functional programming
Mermaid.js

2021 **Progress and prospects for the biological control of invasive alien grasses (Poaceae) in South Africa**
African Entomology 29: 837-858.
Sutton, G.F., Bownes, A., Visser, V., Mapaura, A., & Canavan, K.

2021 **Biological control of South African plants that are invasive elsewhere in the world**
African Entomology 29: 1005-1029
Olckers, T., Coetzee, J.A., Egli, D., Martin, G.D., Paterson, I.D., **Sutton, G.F.**, & Wood, A.R.

2021 **Prioritisation of targets for weed biological control III: A tool to identify the next targets for biological control in South Africa and set priorities for resource allocation**
Biocontrol Science and Technology 31: 584-601
Canavan, K., Hill, M.P., Ivey, P., **Sutton, G.F.**, Paterson, I.D.

2021 **Reduction of grazing index in high elevation grasslands following Black locust invasion in South Africa**
Rangeland Ecology and Management 76: 109-117
Chikowore, G., Mutamiswa, R., Martin, G.D., **Sutton, G.F.**, & Chidawanyika, F.

2021 **Field-based ecological studies to assess prospective biological control agents for invasive alien plants: An example from giant rat's tail grass**
Journal of Applied Ecology 58: 1043-1054
Sutton, G.F., Canavan, K., Day, M.D., & Paterson, I.D.

2020 **Climate modelling suggests a review of the legal status of Brazilian pepper *Schinus terebinthifolia* in South Africa is required**
South African Journal of Botany 132: 95-102
Martin, G.D., Magengelele, N.L., Paterson, I.D., **Sutton, G.F.**

2019 **Grasses as suitable targets for classical weed biological control**
BioControl 64: 605-622
Sutton, G.F., Canavan, K., Day, M.D., Den Breeyen, A., Cristofaro, M., McConnachie, A., Goolsby, J.A., & Paterson, I.D.

2019 **Searching for a needle in a haystack: where to survey for climatically-matched biological control agents for two grasses (*Sporobolus* spp.) invading Australia**
Biological Control 129: 37-44
Sutton, G.F.

2018

Evaluating the efficacy of *Hypogeococcus* sp. as a biological control agent of the cactaceous weed *Cereus jamacaru* in South Africa

BioControl 63: 493-503

Sutton, G.F., Klein, H., & Paterson, I.D.

2017

Genetic matching of invasive populations of the African tulip tree, *Spathodea campanulata* Beauv. (Bignoniaceae), to their native distribution: maximising the likelihood of selecting host-compatible biological control agents

Biological Control 114: 167-175

Sutton, G.F., Paterson, I.D., & Paynter, Q.

2017

Predicting the risk of non-target damage to a close relative of a target weed using sequential no- choice tests, paired-choice tests and olfactory discrimination experiments

Biocontrol Science and Technology 27: 364-377

Sutton, G.F., Paterson, I.D., Compton, S.G., & Paynter, Q.

2016

Naturally occurring phytopathogens enhance biological control of water hyacinth (*Eichhornia crassipes*) by *Megamelus scutellaris* (Hemiptera: Delphacidae), even in eutrophic water

Biological Control 103: 261-268

Sutton, G.F., Compton, S.G., & Coetzee, J.A.

SOFTWARE DEVELOPMENT

Current | 2019

R Package: *ThermalSampleR*

• *ThermalSampleR* is an R package I co-wrote and maintain that performs a range of simulations to aid sample size planning for experiments determining physiological limits (e.g. CT_{min}/CT_{max}) of biological organisms.

Current | 2019

R Package: *sapiaR*

• *sapiaR* is a developmental R package I wrote and maintain that automates the calculation of geospatial statistics and plotting of the characteristic South African Plant Invaders Atlas (SAPIA)-style distribution maps used in numerous publications on invasive plants in South Africa.

Current | 2020

Julia Package: *ModelCheck.jl*

• *ModelCheck.jl* is a developmental Julia package I wrote and maintain that allows users to perform model diagnostics on their fitted statistical models, by producing a range of residual diagnostics plots (e.g. quantile-quantile plots, fitted versus residuals plots).

TEACHING

Current | 2019

Introduction to R for biologists

• As co-instructor, I developed a series of lectures for this Honours-level course on linear modelling in R. These lectures introduce students to common statistical analyses used in the field of ecology, including: linear regression, ANOVA, ANCOVA and more complex linear models (e.g. binomial GLM, poisson GLM), and demonstrate how to code these analyses in R, including: model diagnostics and evaluation, inference and producing publication-quality written summaries and visualisations.

Current | 2019

R workshops

• I have developed a number of weekly 1 - 1.5 hour and multi-day statistics workshops, primarily using the R statistical software, to graduate students, faculty and industry partners. These workshops are driven by the needs of the attendees, covering topics including: data management/curation, data cleaning, linear modelling, multivariate analyses, data visualisation and spatial analyses (e.g. mapping).

CONFERENCE PROCEEDINGS

2018

A weed biocontrol program for the Cook Islands: progress report
Proceedings of the XV International Symposium on the Biological Control of Weeds
Paynter, Q., Poeschko, M., Mitchell, C., Probst, C., Barreto, R.W., Colman, A.A., Macedo, D., Dodd, S., Johnson, T., McCormack, G., Paterson, I.D., **Sutton, G.F.**, & Winks, C.J.

CONFERENCE PRESENTATIONS

2021

South Africa is a hotspot for previously unknown stem-boring wasps of grasses (*Tetramesa*; Eurytomidae)
56th Annual Congress of the Grassland Society of Southern Africa
Sutton, G.F., van Steenderen, C., Canavan, K., Yell, L., & Paterson, I.D.

2021

Anthropogenic disturbance reduces the prevalence and abundance of specialist, but not generalist, grass-associated insects across South Africa: implications for biological control
22nd Congress of the Entomological Society of Southern Africa
Sutton, G.F., Canavan, K., & Paterson, I.D.

2020

Invasive grasses as suitable biological control targets: a South African perspective
46th South African Association of Botanists Annual Conference
Sutton, G.F., Canavan, K., Visser, V., & Paterson, I.D.

2019 **Are grasses suitable targets for biological control?: a case-study of two African grasses (*Sporobolus* spp.) invading Australia**
46th National Symposium on Biological Invasions in southern Africa
Sutton, G.F., Canavan, K., & Paterson, I.D.

2018 **Invasive grasses and classical weed biological control: are we missing a trick?**
Invasive Grass Working Group Meeting
Sutton, G.F., Chari, L., & Canavan, K.

2018 **Prospects for the biological control of invasive rat's tail grasses (*Sporobolus* spp.) in Australia**
XV International Symposium on the Biological Control of Weeds
Sutton, G.F., Day, M.D., Canavan, K., & Paterson, I.D.

2017 **Are invasive grasses good targets for biological control?: A case study of two African *Sporobolus* spp. invading Australia**
52nd Annual Congress of the Grassland Society of Southern Africa
Sutton, G.F., Canavan, K., & Paterson, I.D.

2017 **Does *Hypogeococcus festerianus* (Hemiptera: Pseudococcidae) successfully control the cactaceous weed *Cereus jamacaru* in South Africa?**
44th National Symposium on Biological Invasions in southern Africa
Sutton, G.F., Klein, H., & Paterson, I.D.

2015 **Potential biological control agents for *Spathodea campanulata* (Bignoniaceae)**
XIX Congress of the Entomological Society of Southern Africa
Paterson, I.D., Paynter, Q., **Sutton, G.F.**, & Mpekula, O.

2015 **Determination of the origin of two invasive populations of African Tulip Tree using ISSR and AFLP molecular markers**
XIX Congress of the Entomological Society of Southern Africa
Sutton, G.F., Timm, A.E., & Paterson, I.D.

COMMUNITY ENGAGEMENT

(1) PUBLIC SEMINARS

2021 **Invasive alien species in urban gardens - regulations and management.**
Port Alfred Gardeners Society
Sutton, G.F.

(2) OUTREACH

2019 | 2015

Student Mentor
Entomological Society of Southern Africa Student Outreach Programme
- Assisted in laboratory set-up, specimen collection and preservation, and practical demonstrations of several aspects of entomology to local school groups

2016 | 2015

Student Assistant
WILDreach Society, Rhodes University
- Aided in specimen collection, curation and preservation techniques, and practical demonstrations and explanations of general aspects of entomology and undergraduate biology to local school groups

PROFESSIONAL SERVICE

(1) PEER REVIEW

I have served as an expert reviewer for:

- Biological Invasions (3 papers)
- Austral Ecology (2 papers)
- Biological Control (1 paper)
- BioControl (1 paper)
- Biocontrol Science and Technology (1 paper)
- Plant Ecology (1 paper)
- Arthropod-Plant Interactions (1 paper)
- The Rangeland Journal (1 paper)
- South African Journal of Botany (1 paper)
- Environmental Monitoring and Assessment (1 paper)
- Management of Biological Invasions (1 paper)
- Assorted book chapters

(2) PROFESSIONAL GROUPS

2021

Invited member of the scientific committee
45th National Symposium on Biological Invasions
- Screened abstracts and provided recommendations to the conference organisers on how to develop the scientific programme.

2021 | 2017

Alien Grass Working Group of South Africa
Committee member
- This is a professional working group that directly advises government on policies and practices for the management of invasive alien grasses in Southern Africa, including risk assessment and recommendations for listing and regulating new invasive grass species in South Africa

REFERENCES

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