



Grant Number: 2015/50026-1	Principal Investigator: Stephen Ekwaro-Osire
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1 - Please, analyze the progress of the project, the results and publications resulting from it.

(Comments, criticisms and suggestions have been helpful in improving projects.)

Professor Stephen Ekwaro-Osire and Professor Aparecido Carlos Gonçalves are the principal investigators for grant # 2015/50026-1 entitled “Probabilistic Dynamics Analysis and Lubricant Analysis to Improve Reliability of Gearboxes”. Funds were sought and received (\$48K a year) to support a post doc Dr. Joao Paulo Dias. Funds were sought and received (\$20K) to organize and host a workshop at Texas Tech University. Funds were sought and received (\$2K) to organize and host a workshop at Ilha Solteira, Brazil. Professor Ekwaro-Osire, Professor Gonçalves, and Dr. Dias have co-authored numerous publication and made several presentations.

BOOK

[1] S. Ekwaro-Osire, A.C. Gonçalves, and F.M. Alemayehu, editors, Probabilistic Prognostics and Health Management of Energy Systems, Springer, New York, 2017. (ISBN: 978-3-319-55851-6)

BOOK CHAPTERS

[6] H.B. Endeshaw, S. Ekwaro-Osire*, F.M. Alemayehu, and J.-P. Dias, “The Remaining Useful Life of Gears with Inherent Uncertainties,” in VDI-Berichte 2294, Volume 2, (Editor: VDI Wissensforum GmbH), VDI Verlag GmbH, Düsseldorf, Germany, Chapter 96, pp. 1063–1072, 2017. (ISBN: 978-3-18-092294-2)

[5] S. Ekwaro-Osire, H.B. Endeshaw, F.M. Alemayehu, and O. Gecgel, “Probabilistic Model-Based Prognostics Using Meshfree Modeling,” in Probabilistic Prognostics and Health Management of Energy Systems, (Editors: S. Ekwaro-Osire, A.C. Gonçalves, F.M. Alemayehu), Springer, New York, Chapter 5, 2017. (ISBN: 978-3-319-55851-6)

[4] F.M. Alemayehu, and S. Ekwaro-Osire, “Probabilistic Prognostics and Health Management: A Brief Summary,” in Probabilistic Prognostics and Health Management of Energy Systems, (Editors: S. Ekwaro-Osire, A.C. Gonçalves, F.M. Alemayehu), Springer, New York, Chapter 1, 2017. (ISBN: 978-3-319-55851-6)

[3] J.P. Dias, , M.A. Bazani, A.T. Paschoalini, and L. Barbanti, “A Review of Crack Propagation Modeling using Peridynamics,” in Probabilistic Prognostics and Health Management of Energy Systems, (Editors: S. Ekwaro-Osire, A.C. Gonçalves, F.M. Alemayehu), Springer, New York, Chapter 7, 2017. (ISBN: 978-3-319-55851-6)

[2] L. Barbanti, B.C Damasceno, A.C. Gonçalves, and H. Kuzminskas, “The Use of Trend Lines Channels and Remaining Useful Life Prediction,” in Probabilistic Prognostics and Health Management of Energy Systems, (Editors: S. Ekwaro-Osire, A.C. Gonçalves, F.M. Alemayehu), Springer, New York, Chapter 11, 2017. (ISBN: 978-3-319-55851-6)

[1] F.C.L. de Almeida, A.C. Gonçalves, M.J. Brennan, A.T. Paschoalini, A.A. Junior, and E.F.M. Silva, “An Illustration of Some Methods to Detect Faults in Geared Systems Using a Simple Model of Two Meshed Gears” in Probabilistic Prognostics and Health Management of Energy Systems, (Editors: S. Ekwaro-Osire, A.C. Gonçalves, F.M. Alemayehu), Springer, New York, Chapter 14, 2017. (ISBN: 978-3-319-55851-6)

PEER-REVIEWED CONFERENCE PUBLICATIONS

[5] H.B. Endeshaw, F.M. Alemayehu, S. Ekwaro-Osire, and J.-P. Dias “A Probabilistic Model-Based Prognostics Using Meshfree Modeling: A Case Study on Fatigue Life of a Cantilever Beam,” Proceedings of the 2016 ASME International Mechanical Engineering Congress & Exposition, Phoenix, Arizona, Nov 11–17, 2016.

[4] S. Ekwaro-Osire, H.B. Endeshaw, O. Gecgel, and F.M. Alemayehu, “Uncertainty in Remaining Useful Life,” Proceedings of the Probabilistic Prognostics and Health Management of Energy Systems Workshop, Ilha Solteira, Brazil, Dec 14–15, 2015.

[3] F.M. Alemayehu and S. Ekwaro-Osire, “Probabilistic MBDA and PHM for Reliability of Wind Turbine Drivetrain,” Proceedings of the Probabilistic Prognostics and Health Management of Energy Systems Workshop, Ilha Solteira, Brazil, Dec 14–15, 2015.

[2] A.C. Gonçalves, S. Ekwaro-Osire, and F.M. Alemayehu, “Probabilistic Prognostics and Health

Management of Energy Systems - Editorial Note," Proceedings of the Probabilistic Prognostics and Health Management of Energy Systems Workshop, Ilha Solteira, Brazil, Dec 14–15, 2015.

[1] S. Ekwaro-Osire, H. Endeshaw, D. Pham, and F.M. Alemayehu, "Uncertainty in Remaining Useful Life Prediction" Proceedings of the 2015 ABCM International Congress of Mechanical Engineering - COBEM2015, Rio de Janeiro, Brazil, Dec 6–11, 2015.

PLENARY PRESENTATION

[1] S. Ekwaro-Osire, 'Uncertainty, Transdisciplinarity, Energy, and International Collaboration Themes," Probabilistic Prognostics and Health Management of Energy Systems Workshop, Ilha Solteira, Brazil, Dec 14–15, 2015.

PRESENTATIONS

[7] Probabilistic Prognostics and Health Management of Energy Systems, TTU/FAPESP – SPRINT "STEM Across Continents" Workshop and Conference, Lubbock, TX, Sep 21-22, 2017.

[6] Role of Uncertainty in Engineering and Bio Systems, The Federal University of Santa Catarina (UFSC), Florianópolis, SC, Brazil, May 29, 2017.

[5] New Trends in Probabilistic Prognostics and Health Management, São Paulo State University (UNESP), Ilha Solteira, SP, Brazil, May 25, 2017.

[4] Applications of Prognostics and Health Management of Systems, Military Institute of Engineering (IME), Rio de Janeiro, RJ, Brazil, May 23, 2017.

[3] Probabilistic Model-Based Prognostics Using Mesh-Free Modeling, Rio de Janeiro State University (UERJ), Rio de Janeiro, RJ, Brazil, May 22, 2017.

[2] Opportunities for Transdisciplinary Research, São Paulo State University (UNESP), Ilha Solteira, SP, Brazil, Dec 15, 2015.

[1] Perspectives on Bioengineering, São Paulo State University (UNESP), Tupã, SP, Brazil, Dec 11, 2015.

WORKSHOP AND SYMPOSIA ORGANIZED BY PROF EKWARO-OSIRE AND PROF GONÇALVES

[5] TTU/FAPESP – SPRINT "STEM Across Continents" Workshop and Conference, Lubbock, TX, Sep 21–22, 2017.

[4] Minisymposium on Probabilistic Prognostics and Health Management of Energy Systems, Ilha Solteira, Brazil, May 25, 2017.

[3] 2nd Probabilistic Prognostics and Health Management of Energy Systems Workshop (PPHMES 2017), Lubbock, Texas, May 15–16, 2017.

[2] TTU/FAPESP – SPRINT "STEM Across Continents" Workshop and Conference, Lubbock, TX, Aug 31–Sep 1, 2016.

[1] 1st Probabilistic Prognostics and Health Management of Energy Systems Workshop (PPHMES 2015), Ilha Solteira, Brazil, Dec 14–15, 2015.

POST-DOCTORAL RESEARCH ASSOCIATE CURRENTLY MENTORING

[1] J.P. Dias, Ph.D., "Probabilistic Prognostics," Mar 2016–present.

2 – If resources have been granted for participation in scientific meetings, please review the relevance of the work presented.

3- Participation in scientific or technological meetings

Does the importance of the meetings justify the expenses listed in the report?

Yes No

Was there participation in congresses without presentation of work?

Yes No

If so, please discuss the exceptional conditions justifying such expenditure.

4 – Visits to the Brazilian partner

[3] Ilha Solteira, Brazil, May 24-25, 2017

** S. Ekwaro-Osire and A.C. Gonçalves organized the “Minisymposium on Probabilistic Prognostics and Health Management of Energy Systems” in Ilha Solteira. Scientists from academy industry presented over 10 pertinent papers. S. Ekwaro-Osire and A.C. Gonçalves some of the funds from UNESP to put up the workshop. **

[2] Ilha Solteira, Brazil, Dec 13–16, 2015

** S. Ekwaro-Osire and A.C. Gonçalves organized the “1st Probabilistic Prognostics and Health Management of Energy Systems Workshop (PPHMES 2015)” in Ilha Solteira. Scientists from academy, government, and industry presented over 15 pertinent papers. S. Ekwaro-Osire and A.C. Gonçalves submitted a proposal for some of the funds used in putting up the workshop. **

[1] Rio de Janeiro, Brazil, Dec 5–11, 2015

** S. Ekwaro-Osire and A.C. Gonçalves attended the largest international conference in Brazil. The conference was ABCM International Congress of Mechanical Engineering - COBEM2015, and it took place in Rio de Janeiro, Brazil. S. Ekwaro-Osire and A.C. Gonçalves each presented a paper at the conference. **

Was the visit of appropriate duration?

Yes No

Did the Brazilian partner dedicate enough attention for scientific discussion during the visit?

Yes No

If not, please comment on it.

Did the outcome justify the visit?

Yes No

If no, please comment on it?

In the case of other participants in the research proposal (professors or postdocs) who also visited the Brazilian partner. Did the outcome justify the visit?

Yes No

If no, please comment on it?

Workshop and Symposia

[5] TTU/FAPESP – SPRINT “STEM Across Continents” Workshop and Conference, Lubbock, TX, Sep 21–22, 2017.

[4] Minisymposium on Probabilistic Prognostics and Health Management of Energy Systems, Ilha Solteira, Brazil, May 25, 2017.

[3] 2nd Probabilistic Prognostics and Health Management of Energy Systems Workshop (PPHMES 2017), Lubbock, Texas, May 15–16, 2017.

[2] TTU/FAPESP – SPRINT “STEM Across Continents” Workshop and Conference, Lubbock, TX, Aug 31–Sep 1, 2016.

[1] 1st Probabilistic Prognostics and Health Management of Energy Systems Workshop (PPHMES 2015), Ilha Solteira, Brazil, Dec 14–15, 2015.

Post-Doctoral Research Associate Mentored or Currently Mentoring

[1] J.P. Dias, Ph.D., “Probabilistic Prognostics,” Mar 2016–present.

5. Final Analysis

Progress Report Approved

Progress Report Approved with criticisms or suggestions that should be considered in the next scientific report

Progress Report not Approved

Final Report Approved

Final Report Not Approved

INFORMATION FOR THE EXCLUSIVE USE OF TTU

The content of the previous items may, at TTU's discretion, be sent in full to the PI. If you wish to add information considered important for TTU to support your decision and should not be transcribed to the PI by its confidential nature, include them in this space.

THIS ADVISORY IS COMMITTED TO MAINTAINING THE CONFIDENTIALITY OF THIS
REVIEW

I declare that there is no circumstance characterizing a situation of potential conflict of interest or that it may be perceived as an impediment to an exempt opinion. I undertake to keep confidential all the information in this case, in particular my advisory status and the content of this report.

Advisory Institution:

Name:

Place, date and signature: