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# LETTER OF REFERENCE

Mr Dane Lacey, born on November 6, 1996 in Las Vegas, U.S.A., was employed as a student assistant at the Fraunhofer-Gesellschaft e. V., Institute for Wind Energy Systems IWES, Bremerhaven, from July 1, 2021 to March 31, 2022.

The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe. Its research activities are conducted by 75 institutes and research units at locations throughout Germany. The Fraunhofer-Gesellschaft employs a staff of around 29,000, who work with an annual research budget totaling more than 2.8 billion euros. International collaborations with excellent research partners and innovative companies around the world ensure direct access to regions of the greatest importance to present and future scientific progress and economic development. Fraunhofer IWES secures investments in technological developments through validation, shortens innovation cycles, accelerates certification procedures, and increases planning accuracy by means of innovative measurement methods in the wind energy and hydrogen technology sectors. At present, there are more than 300 scientists and employees as well as around 150 students employed at the seven sites: Bremen, Bremerhaven, Görlitz, Hamburg, Hanover, Leuna, and Oldenburg.

Mr Lacey was employed in the group »Global Turbine Dynamics« within the department »System Technology«. The group »Global Turbine Dynamics« conducts research in the field of aero-hydro-servo-elastic simulations of wind turbines and boasts expertise in the load analysis of wind turbines with respect to the requirements of international standards (GL, IEC). The focus lies on the improvement of methods and software accounting for the coupled time-domain simulation of onshore and offshore (floating) wind turbines with standard tools. Furthermore, the fully coupled simulation model MoWiT for wind turbine load calculations and real-time simulation in a hardware-in-the-loop environment has been developed. The newly developed tools are used to optimize on- and offshore wind turbines from a system perspective employing a Python-based optimization and automatization framework. Mr. Laceys tasks at the institute included:

- implementation of a program to determine design equivalent loads for wind turbines in Python
- integration of the program into an existing framework in Python
- optimization of the program for computing resources
- testing the program using integration tests and benchmark results
- documentation of the implemented program

Mr Lacey impressed us with his comprehensive, wide-ranging and in-depth specialist knowledge, which he was always able to apply confidently and in a target-oriented manner in practice. His ability to familiarise himself quickly enabled him to understand even the most complex situations immediately and to recognise key aspects. Mr Lacey always worked using his own initiative and completely identified with his responsibilities and our institute at all times. He always displayed an impressive level of dedication and motivation. Mr Lacey was extremely open to new experiences at all times; he was always willing to learn new things. He kept a cool head, acted responsibly, and completed all tasks commendably even under extreme stress.

Fraunhofer-Institut für Windenergiesysteme IWES
Am Seedeich 45 D-27572 Bremerhaven
Telefon +49 (0) 471 14 290-100
Fax +49 (0) 471 14 290-111

Institutsleitung:
Prof. Dr.-Ing. Andreas Reuter (geschäftsführend)
Kommissarische Institutsleitung:
Dr.-Ing. Sylvia Schattauer

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He always completed his tasks completely independently, extremely carefully and according to a well thought-out plan. He worked calmly, thoughtfully, in a target-oriented manner and extremely precisely at all times. He continuously impressed us particularly in terms of quality and quantity. Mr Lacey continuously impressed us with his extraordinary reliability.

Already after a short period of induction, he was able to find very good solutions, even for the most difficult problems and always achieved excellent work results. We were always and in every respect very satisfied with the performance of Mr Lacey.

He was respected by everyone for his consistently friendly and well-balanced demeanour. He was always helpful, courteous, and where necessary, he put the interests of others before his own. His personal conduct towards his line managers and colleagues was always exemplary and loyal.

The employment contract will be terminated at the end of the fixed term on March 31, 2022. We sincerely regret the departure of Mr Lacey, as we will be losing a very capable employee. We would like to thank him for his consistently very good performance and wish him all the best and continued success in his future career and private life.

Bremerhaven, March 31, 2022

Prof. Dr.-Ing. Jan Wenske
Dept. Director Fraunhofer IWES
Technical Director

Mariel Busch
Head of People & Development

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