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	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER 611103

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9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS (ES) U.S. Army Research Office P.O. Box 12211 Research Triangle Park, NC 27709-2211	10. SPONSOR/MONITOR'S ACRONYM(S) ARO
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13. SUPPLEMENTARY NOTES The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other documentation.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON Chunlei Guo
a. REPORT UU	b. ABSTRACT UU	c. THIS PAGE UU			19b. TELEPHONE NUMBER 585-275-2134

RPPR Final Report
as of 28-Apr-2022

Agency Code: 21XD

Proposal Number: 72070MSRIP

Agreement Number: W911NF-18-1-0204

INVESTIGATOR(S):

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DUNS Number: 041294109

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Report Date: 31-Aug-2019

Date Received: 14-Jul-2019

Final Report for Period Beginning 05-Jun-2018 and Ending 31-May-2019

Title: Enhancing Laser Capacity for Studying Functional Surface Structures on Metals

Begin Performance Period: 05-Jun-2018

End Performance Period: 30-Nov-2019

Report Term: 0-Other

Submitted By: Ph.D. Chunlei Guo

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Phone: (585) 275-2134

Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: 1

STEM Participants: 2

Major Goals: This DURIP project requests instrumentation support to enhance our study of functionalized surface structures on metals. The budget requested here will allow us to purchase equipment that constitute a single system that will significantly boost the experimental capacity and performance for our ongoing DoD projects, primarily our project in the Materials Science Program at ARO (Award number: W911NF-15-1-0319). Furthermore, there has been a significant increase in demand for accelerating our original ARO research from a number of DoD programs. This DURIP project will increase our research capacity in meeting these other DoD research demands as well, including an add-on project to ARO by DARPA, an ARO Army Education and Outreach Program, a sub-contract project from Army ARDEC, and a sub-contract DARPA project led by Boeing. Therefore, this DURIP investment will benefit a total of 5 ongoing DoD related projects all branching out from the ARO project.

Accomplishments: This equipment upgrade project has been successfully carried out, including the following, A new femtosecond laser system from Coherent has been purchased and installed in my lab. An spectrometer including a pulse shaping device was purchased. It is due to be installed in my lab in about 1 month (August-September, 2019).

Training Opportunities: All students, postdoctoral fellows, staff scientists will benefit from this equipment upgrade.

Results Dissemination: Nothing to Report

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI

Participant: chunlei guo

Person Months Worked: 1.00

Funding Support:

Project Contribution:

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National Academy Member: N

Participant Type: Postdoctoral (scholar, fellow or other postdoctoral position)

Participant: Jihua zhang

Person Months Worked: 1.00

Funding Support:

Project Contribution:

National Academy Member: N

Participant Type: Graduate Student (research assistant)

Participant: Billy Lam

Person Months Worked: 1.00

Funding Support:

Project Contribution:

National Academy Member: N

Participant Type: Graduate Student (research assistant)

Participant: Erik Garcell

Person Months Worked: 1.00

Funding Support:

Project Contribution:

National Academy Member: N

ARTICLES:

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Peer Reviewed: Y

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Issue: 21

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Date Submitted: 7/14/19 12:00AM

Date Published: 5/31/18 4:00PM

Publication Location: rochester, ny, usa

Article Title: Polarization-controlled microgroove arrays induced by femtosecond laser pulses

Authors: Erik M. Garcell, Chunlei Guo

Keywords: Polarization, femtosecond laser

Abstract: Using pulsed femtosecond laser irradiation, we demonstrate the creation of an array of microgrooves within a single laser spot on metals. The orientation of these grooves is not limited to being parallel to the plane of the laser beam's propagation but can orient at any angle up to 30 from parallel. We control the orientation of the microgrooves by proportionally varying the laser's polarization. Polarization, angle of incidence, and structural evolution dynamics have been thoroughly studied to help us understand this phenomenon. Our studies suggest that the formation of angled microgroove arrays is due to a feedback effect occurring between defect-focused ablation and polarization-dependent laser-induced periodic surface structures.

Distribution Statement: 1-Approved for public release; distribution is unlimited.

Acknowledged Federal Support: Y

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Partners

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Signature:

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(see accomplishments and the rest of the materials provided)