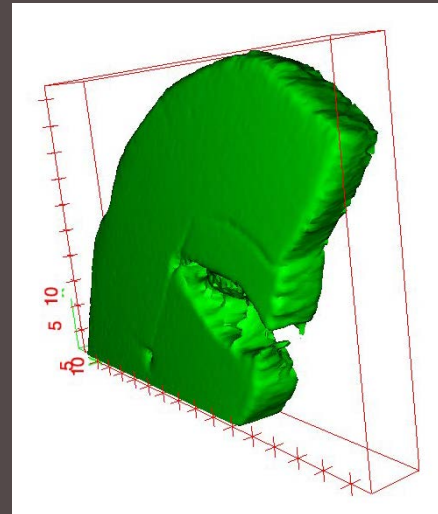
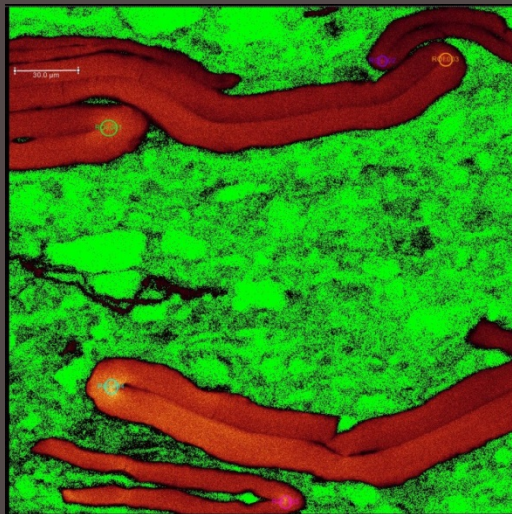


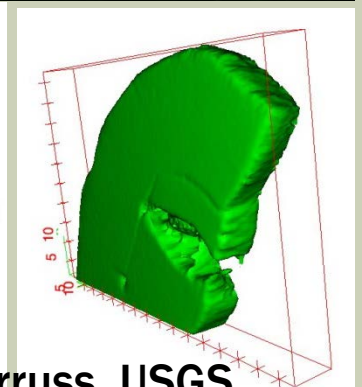
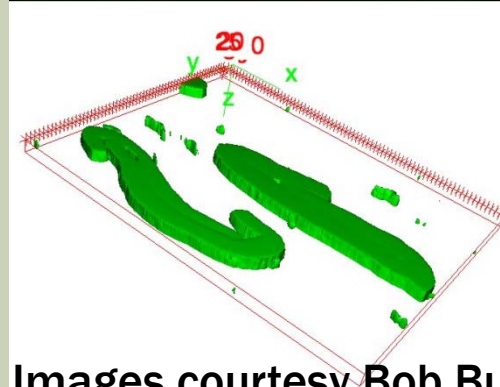
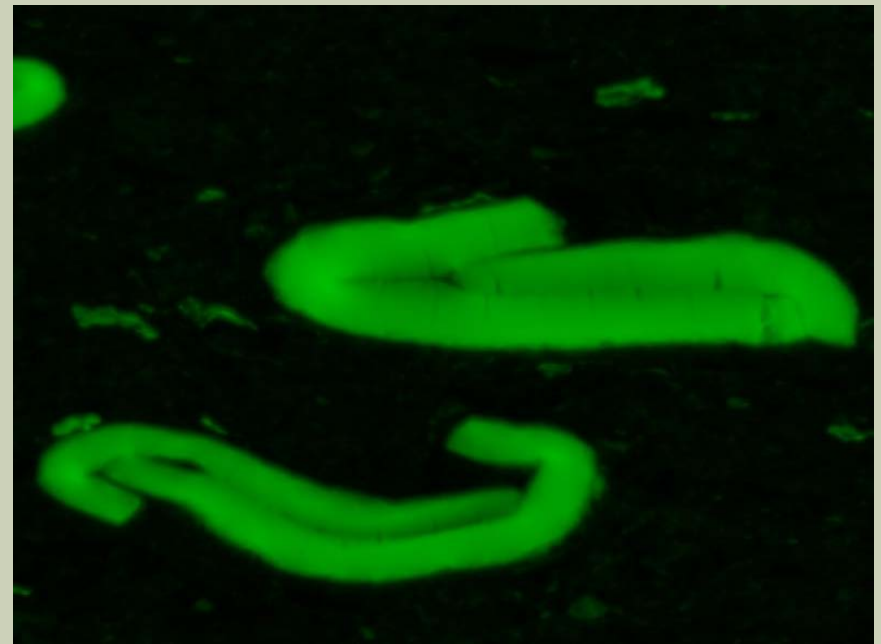
CONFOCAL LASER SCANNING MICROSCOPY (CLSM) WORKING GROUP 2017

Paul C. Hackley
Jolanta Kus



WHY USE CLSM ON SEDIMENTARY ORGANIC MATTER?

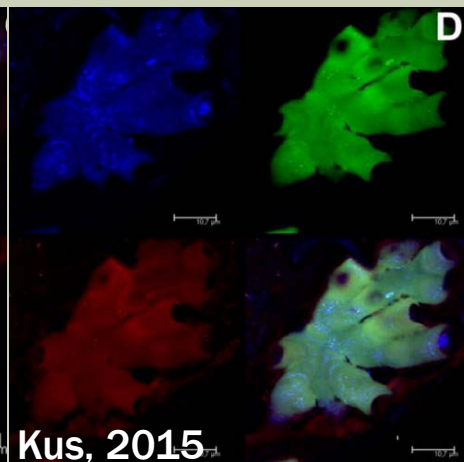
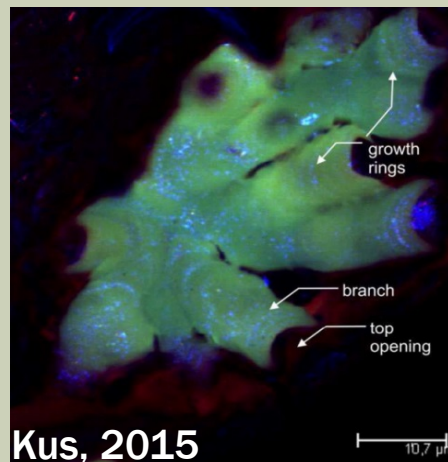
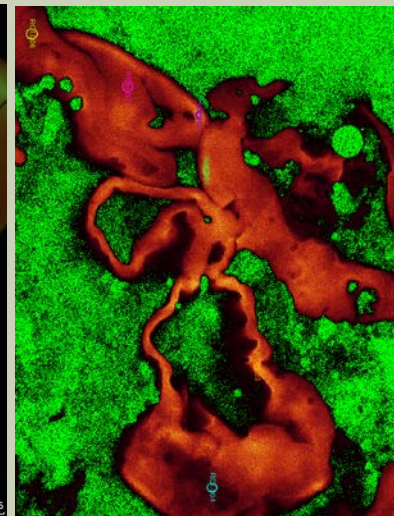
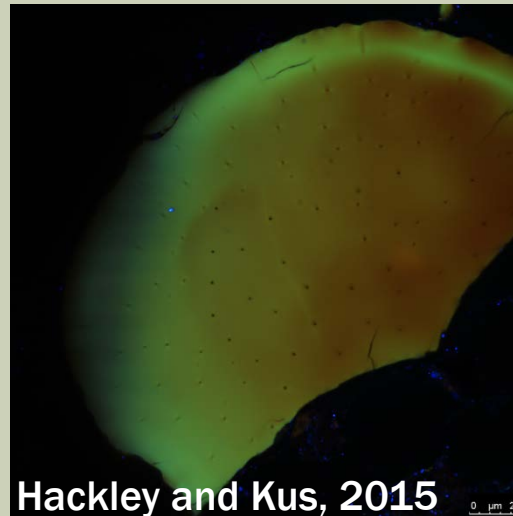
- ❑ Many applications
- ❑ Technique is broadly underutilized
- ❑ High resolution (~200 nm)
- ❑ 2-D and 3-D imaging
- ❑ 3-D reconstructions, video
- ❑ Non-destructive
- ❑ Fluorescence spectroscopy



Images courtesy Bob Burruss, USGS

CLSM WG UPDATE 2017

- ❑ Working Group approved in Potsdam 2015
- ❑ Note in ICCP News 63
- ❑ Presentation at GSA, Baltimore Nov 2015
- ❑ User survey sent Feb 2016

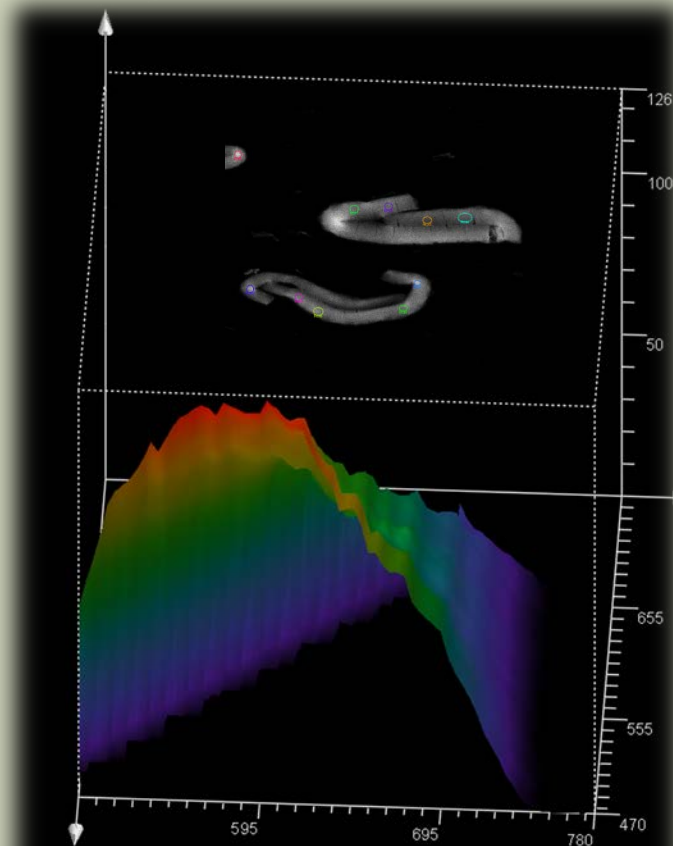


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CLSM SURVEY

Three Questions sent by email:

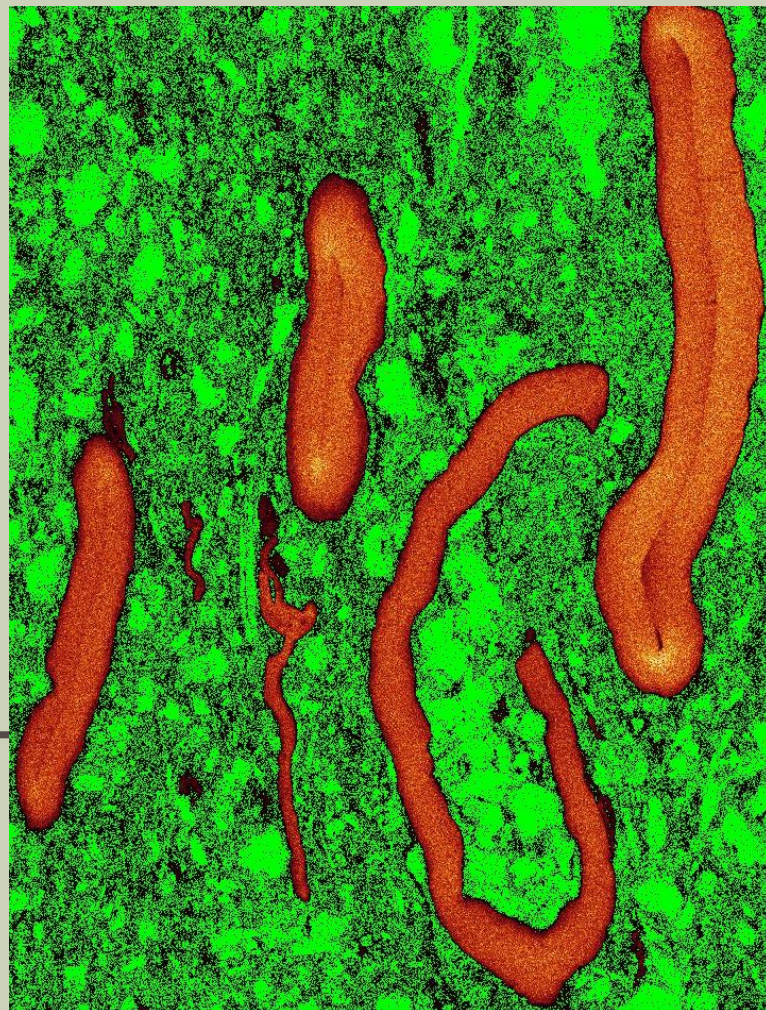
- 1. Access: Yes or No
- 2. If yes, describe the instrument
- 3. What applications are you interested in?



CLSM SURVEY RESULTS

Instrument Access:

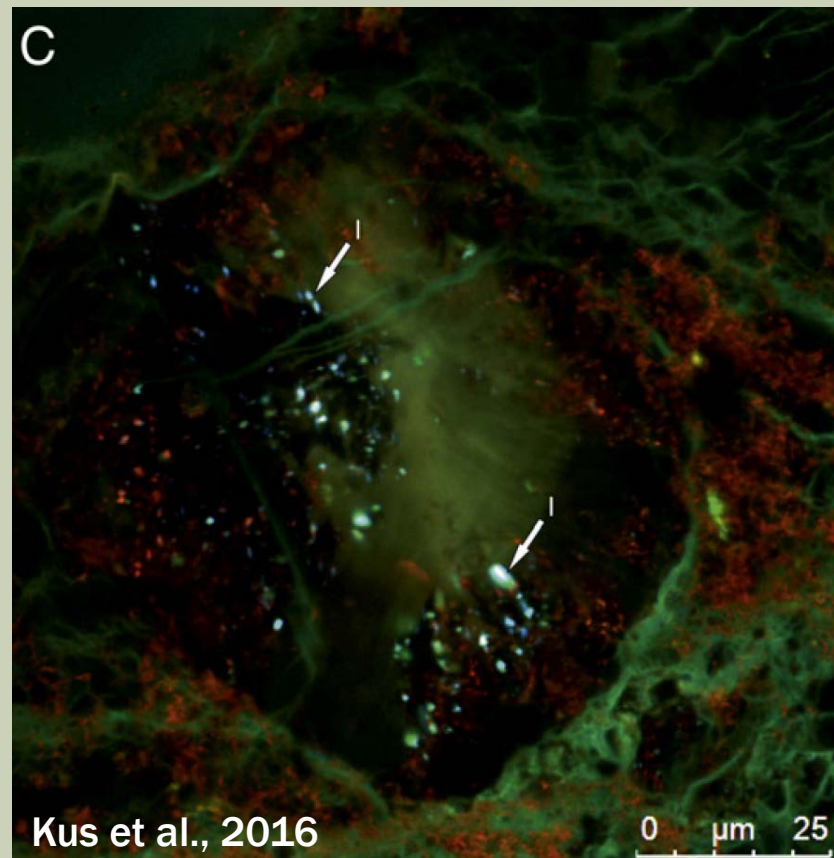
- No (4)
- Yes (7): Dragana Zivotic (Univ. Belgrade), Jolanta Kus (BGR), Marc Curtis (Univ. OK), Bill Schopf (UCLA), Paul Hackley (USGS), Joao Graciano (UFRJ), Angeles Borrego & Isabel Suarez-Ruiz (INCAR)
- Maybe: Katrin Ruckwied (Shell)



CLSM SURVEY RESULTS

Instruments:

- Keyence VK-X200 series (Curtis)
- Leica DMI 6000 CS Bino (Kus)
- Leica SP2 inverted (Zivotic)
- OLYMPUS FluoView FV300 (Schopf)
- Leica SP5 X Confocal (Hackley)



CLSM SURVEY RESULTS

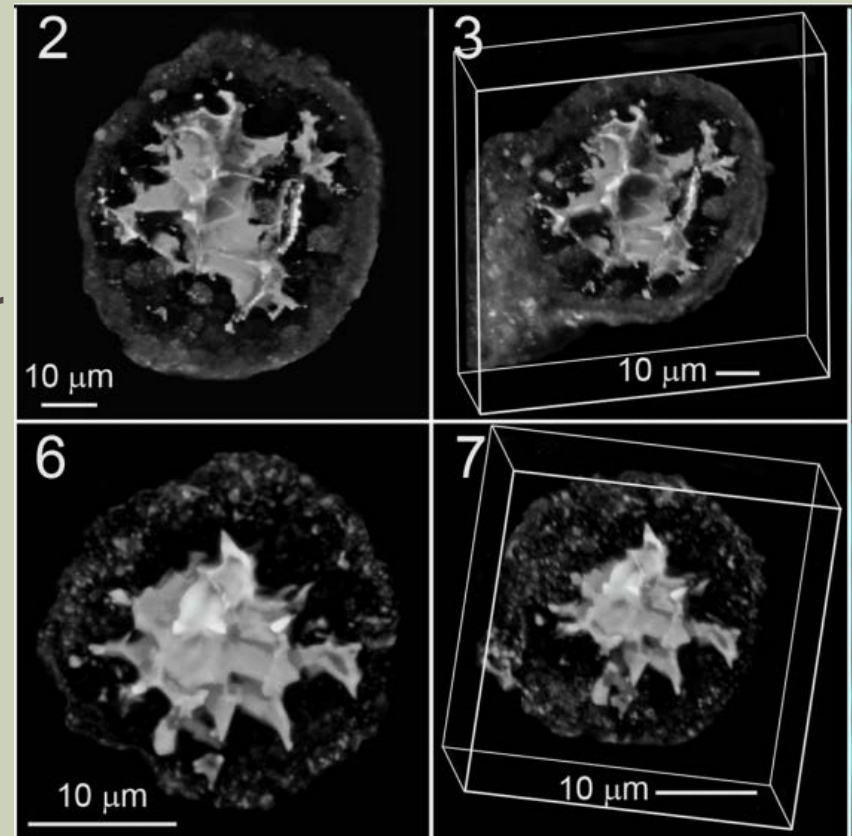
Applications:

■ Imaging:

- Artificial fracture networks
- Proppant embedment
- 3-D sedimentary organic matter
- Sub-microscopic identification
- 3-D distribution oil inclusions
- Cellular morphology

■ Spectroscopy

- Characterization of macerals
- Thermal maturity probe
- Relation to composition and structure

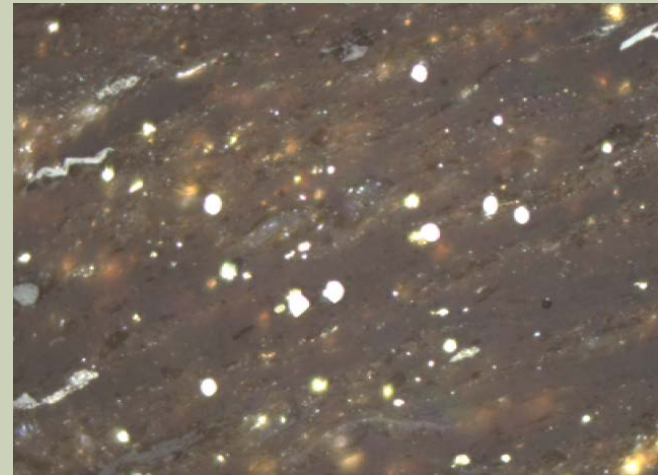


Schopf et al., 2015

CLSM WG 2017 SUMMARY

Summary:

- We know the instruments available
- We know who the people are
- We know the applications in sedimentary organic matter
- We have established a Working Group



Next Step(s):

- Summary for ICCP News
- Decide on study objectives
- Kimmeridge Clay Formation: 44 wt.% TOC, $R_o \sim 0.35\%$, imaging of 3-D AOM structures, effects of ion-milling, HP?

