



# MuhammEgg Ali

## *Making the invisible visible: A case study on repetitive egg impacts*

**Bronwen Holdsworth<sup>1,2</sup>, Paul Condron<sup>2,3</sup>, Taylor Emsden<sup>2,3</sup>, Eryn Kwon<sup>2,3</sup>, Vickie Shim<sup>2,4</sup>, Dan Cornfeld<sup>2,3</sup>, Deborah Pearson<sup>5</sup>, Katharine Holdsworth<sup>6</sup>, Edward Holdsworth<sup>7</sup>, Samantha Holdsworth<sup>2,3</sup>, Oliver Tilghman<sup>8</sup>**

[1] Pultron Composites Ltd, Tairāwhiti Gisborne, New Zealand

[2] Mātai Medical Research Institute, Tairāwhiti Gisborne, New Zealand

[3] Department of Anatomy & Medical Imaging, Faculty of Medical & Health Sciences, University of Auckland, New Zealand

[4] Auckland Bioengineering Institute, University of Auckland, Auckland, New Zealand

[5] SOBH, Perth, Australia.

[6] SOSH, DOBH, Kirkland, Seattle, Washington, U.S.A

[7] Department of Engineering, University of Canterbury, Christchurch, New Zealand

[8] Gisborne Boys High School, Tairāwhiti Gisborne, New Zealand



# Methods

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- A large batch of chicken eggs was used, alongside a standard-sized boxing ring for eggs adapted for safety.
- Reference methodologies as discussed by Peter Attia were consulted [1]
- Two eggs were initially selected from the batch for combat to determine resilience, with one emerging as a champion and named 'MuhammEgg Ali'\*.
- Over 3 months (15 Dec 2023 – 15 March 2024), MuhammEgg Ali underwent repeated boxing attempts against a new roster of eggs to test durability.
- Each match was documented under controlled conditions for accuracy.
- Eggs defeated by MuhammEgg Ali were utilised in various baking recipes.
- Upon completing 200 boxing attempts, MuhammEgg Ali and a fresh egg were scanned with a 3-Tesla GE Signa Premier MRI scanner to observe internal structural differences.



[1] <https://peterattiamd.com/egg-boxing>

[2] Named by Oliver Tilghman



Victor: 49  
championships



58



72



80



95



**100<sup>th</sup>**  
**victory**



110



130



140



170



181



190

*200<sup>th</sup> victory*







**Mātai**  
Te Mata Mātai Hura

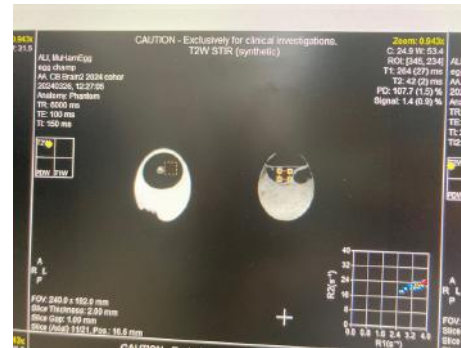
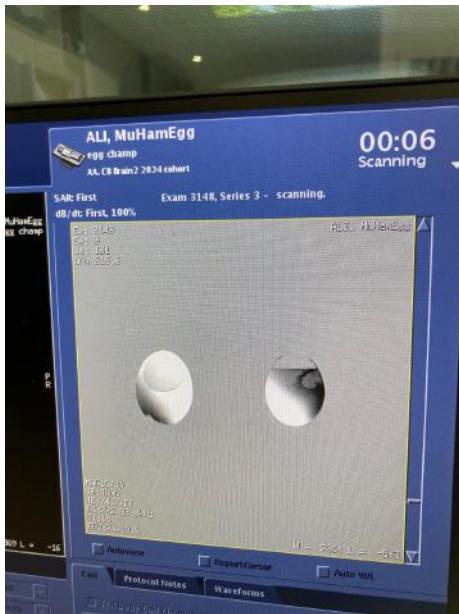
# MRI Scanning Procedure





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# MRI scan analysis & results



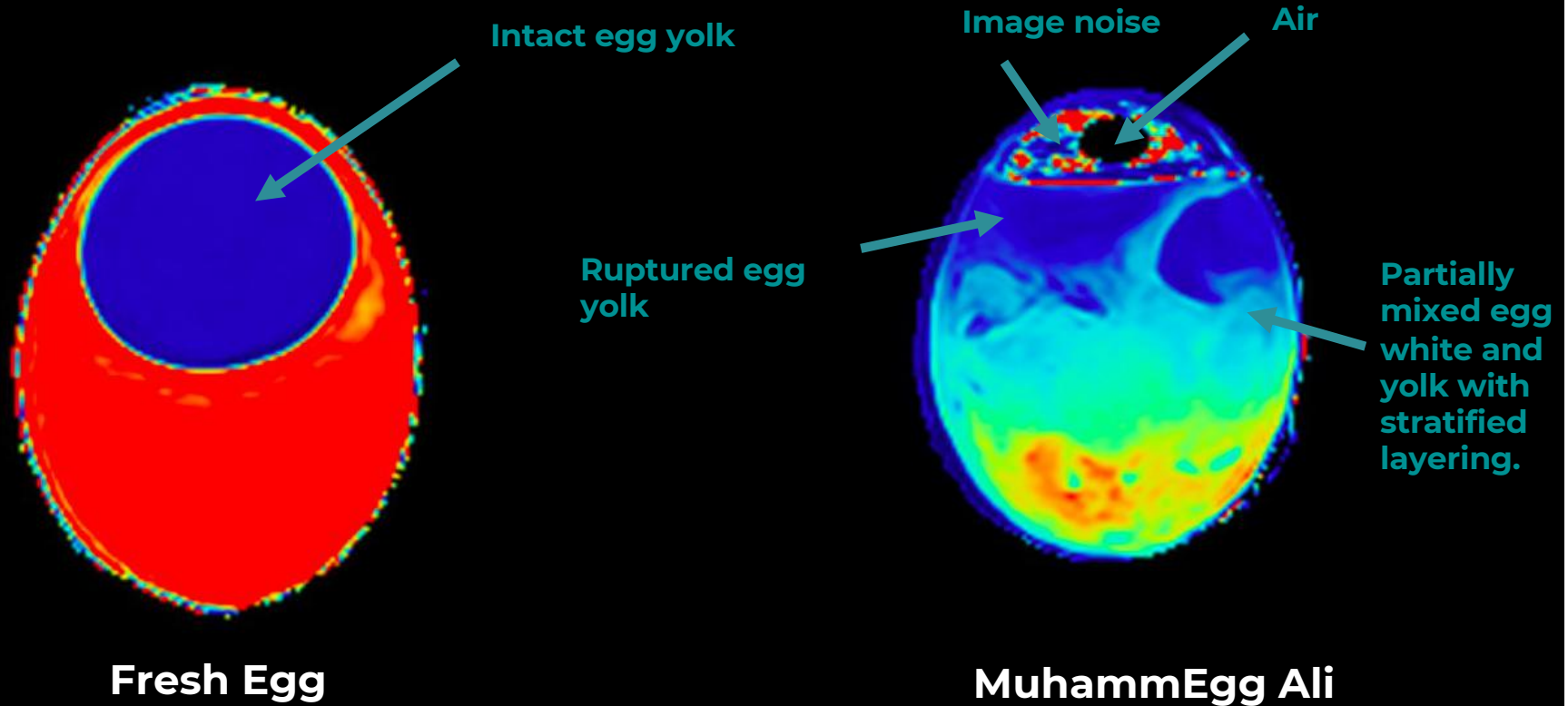
# Fluid images

T2 map



# Fluid images – colour overlay

R2 map





# Fluid images

O Axial FSE-T2: T2MAP w/ARC Echo 1<->T2 Map

Se:4 / 4

S: 16.6 (coi)

Im: 65

DFOV 18.0 cm

50 %

ALI MuHamEgg

Matai Medical Research Institute

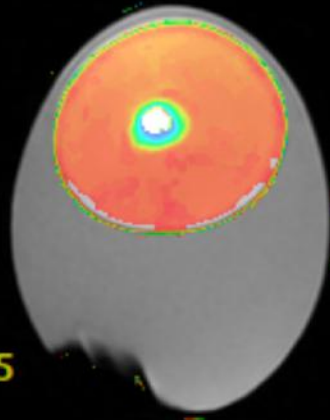
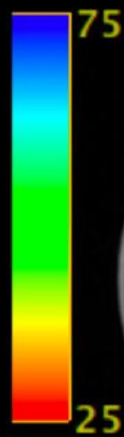
ALS

egg champ

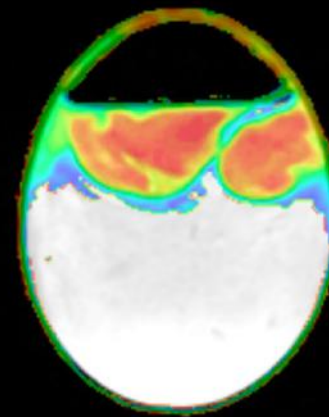
12:32:23 PM

Ex:Mar 26 2024

1.00 x



Fresh Egg



MuhammEgg Ali

L  
P  
S

T2 map



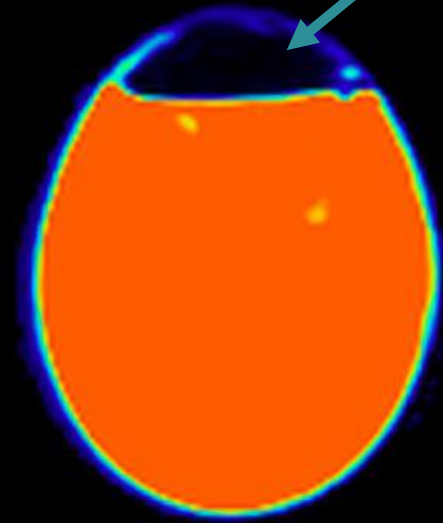
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# Proton density images



Fresh Egg

Indicating similar quantity of protons aside from air-filled pocket in MuhammEgg Ali



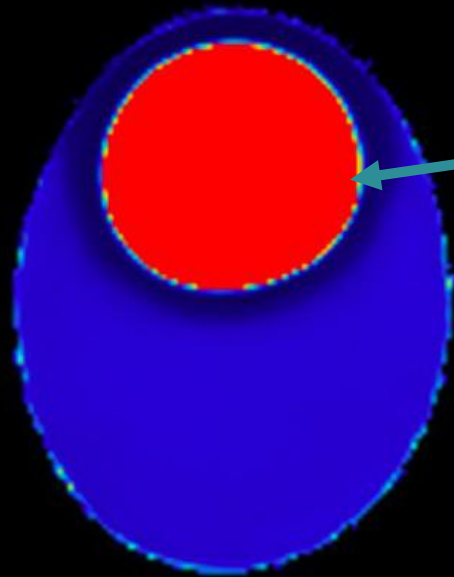
MuhammEgg Ali

Based off MAGIC MRI



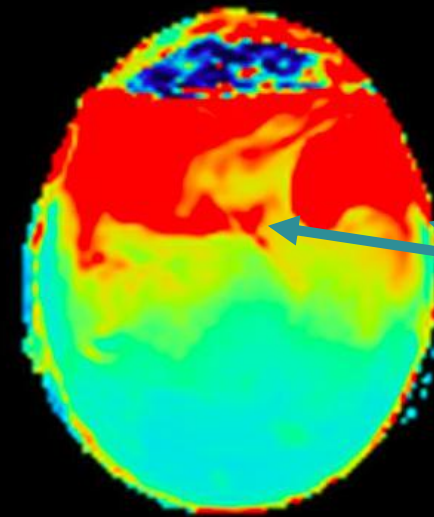
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# Structural images



Fresh Egg

Solid egg yolk



$\Pi$  map. Based off MAGIC MRI

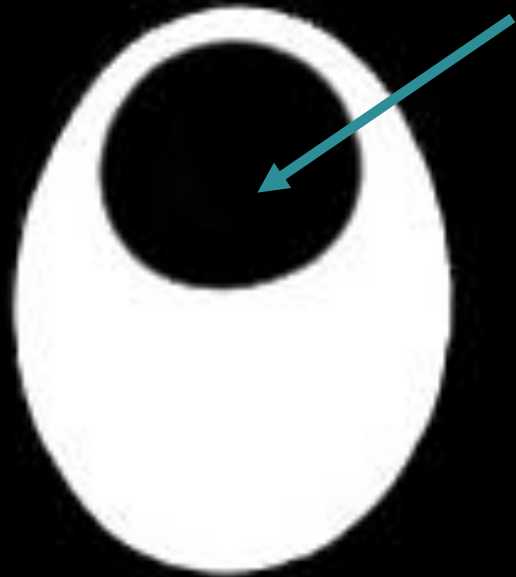
Stratifying viscous egg yolk

MuhammEgg Ali



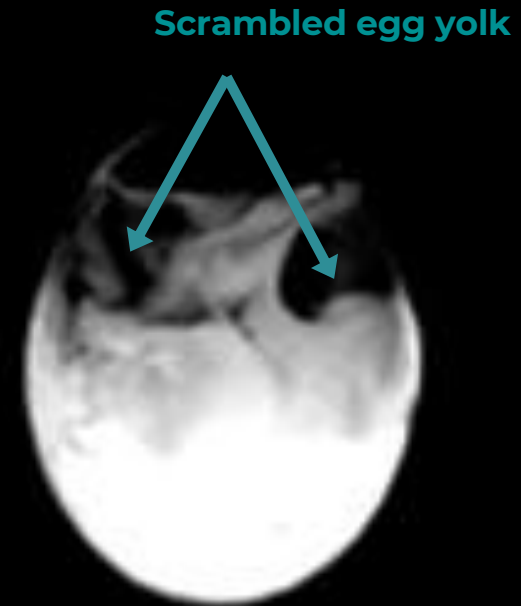
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# Fat saturated images



Well circumscribed structure confirming fatty egg yolk

Fresh Egg



Scrambled egg yolk

T2 STIR. Based off MAGIC MRI

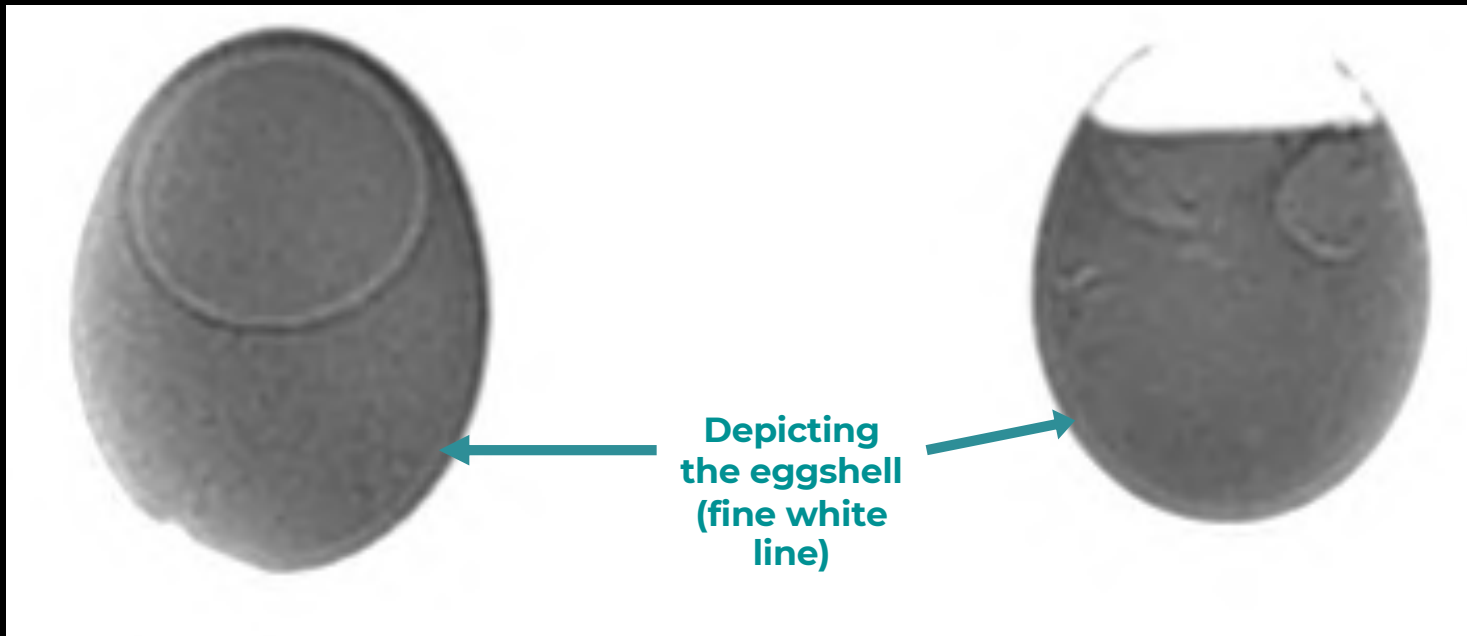
MuhammEgg Ali



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# 'Bone' images



Fresh Egg

MuhammEgg Ali

Ultrashort  
echo time  
MRI: Based  
off OZTEO  
MRI



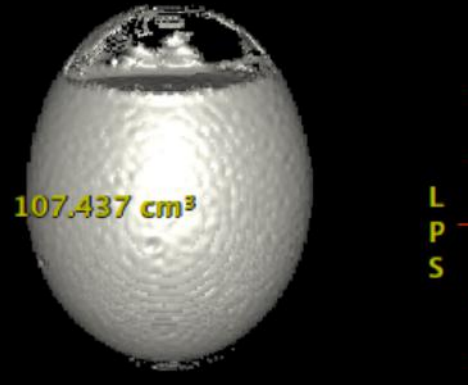
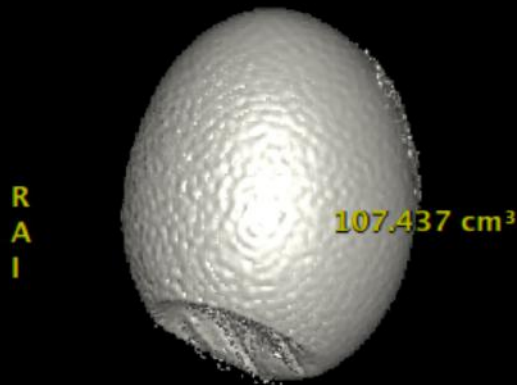
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3D  
Se:5  
Volume Rendering No cut  
DFOV 18.4 cm

ASL

ALI MuHamEgg  
Matai Medical Research Institute  
egg champ  
12:37:54 PM  
Ex:Mar 26 2024  
1.20 x

## Rendered 'Bone' images



Ultrashort  
echo time  
MRI: Based  
off OZTEO  
MRI

No VOI  
ozteo  
TR:568  
TE:0  
EC:1/1 62.5kHz  
20MM/FL:sg  
05:33  
1.0mm /0.80sp  
280X280/8.00 NEX  
SqP/INV  
W = 1818 L = 1401

Fresh Egg

MuhammEgg Ali

550/1

PIR



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## Results

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- The thickness of the eggshell was 1.2mm and 1.3mm for MuhammEgg Ali and the fresh egg, respectively.
- The internal fluid volume of the egg was 46cm<sup>3</sup> and 56cm<sup>3</sup> for MuhammEgg Ali and the fresh egg, respectively.
- MRI scans indicated significant internal structural damage in MuhammEgg Ali, challenging visual assessments of integrity.
- Fluid and structural scans revealed a high content of mixed viscous fluid within MuhammEgg Ali compared to the fresh egg, which had two distinct compartments.
- Upon opening, MuhammEgg Ali's contents were mixed and rotten, confirming diagnosis, and underscoring the discrepancy between external resilience and internal condition.





# Discussion & Conclusion

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- **MuhammEgg Ali's experiment demonstrates the deceptive nature of external integrity, revealing significant internal damage despite the shell's intact appearance after 200 impacts.**
- **This discrepancy highlights the necessity of integrating both internal and external evaluations for a comprehensive assessment of structural integrity.**
- **The ambiguity surrounding the damage's cause—whether due to age, repetitive impacts, or both—emphasises the complexity of material durability assessments and suggests the need for further research beyond superficial assessments.**







# Limitations & Future Directions

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- **The experiment was limited by the age difference between the tested egg (3 months) and a fresh egg (2 weeks), highlighting the need to account for age and health in damage assessments.**
- **Omitting a reference egg to track natural degradation was a missed chance for comparison. Future tests should include control eggs from each batch.**
- **With a sample size of just one egg, the findings have limited applicability. Future studies should increase the number of eggs tested.**
- **Recommendation for further research into how an egg's age and health affect its resilience to impacts, aiming to better understand shell durability.**

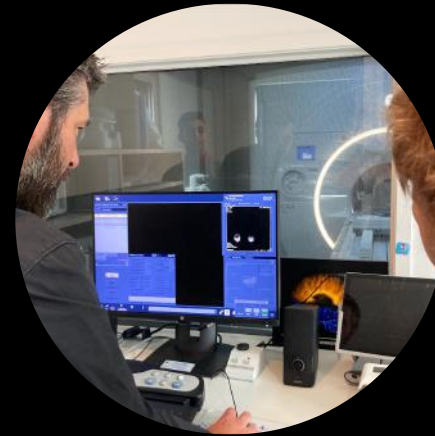




## Key message

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### What shines on the outside, may not glow within



**At Mātai, our curiosity propels us. Using advanced imaging techniques, we image beneath the surface to unlock the mysteries lying within.**

**It's our way of revealing the unseen, as sometimes what we see externally doesn't align with the reality inside.**



**Rest in peace  
MuhammEgg Ali**

AI impression (DALL-E)