

## Publications

### **Male and female syringeal muscles exhibit superfast shortening velocities in zebra finches**

Gladman, N. W. & Elemans, C. P. H., 8. Apr 2024, In: *Journal of Experimental Biology*. 227, 7, jeb246330.

### **Evolutionary novelties underlie sound production in baleen whales**

Elemans, C. P. H., Jiang, W., Jensen, M. H., Pichler, H., Mussman, B. R., Nattestad, J., Wahlberg, M., Zheng, X., Xue, Q. & Fitch, W. T., Mar 2024, In: *Nature*. 627, 8002, p. 123-129

### **Daily vocal exercise is necessary for peak performance singing in a songbird**

Adam, I., Riebel, K., Stål, P., Wood, N., Previs, M. J. & Elemans, C. P. H., Dec 2023, In: *Nature Communications*. 14, 1, 12 p., 7787.

### **Predicting 3D soft tissue dynamics from 2D imaging using physics informed neural networks**

Movahhedi, M., Liu, X. Y., Geng, B., Elemans, C., Xue, Q., Wang, J. X. & Zheng, X., Dec 2023, In: *Communications Biology*. 6, 1, 10 p., 541.

### **The reconstruction of flows from spatiotemporal data by autoencoders**

Fainstein, F., Catoni, J., Elemans, C. P. H. & Mindlin, G. B., Nov 2023, In: *Chaos, Solitons and Fractals*. 176, 7 p., 114115.

### **Toothed whales use distinct vocal registers for echolocation and communication**

Madsen, P. T., Siebert, U. & Elemans, C. P. H., 3. Mar 2023, In: *Science (New York, N.Y.)*. 379, 6635, p. 928-933

### **A flexible carbon nanotube electrode array for acute in vivo EMG recordings**

Pack, A. R., Yan, J. S., Pasquali, M., Sober, S. J. & Elemans, C. P. H., 1. Mar 2023, In: *Journal of Neurophysiology*. 129, 3, p. 651-661

### **Dynamic System Coupling in Voice Production**

Herbst, C. T., Elemans, C. P. H., Tokuda, I. T., Chatziioannou, V. & Švec, J. G., 1. Feb 2023, (E-pub ahead of print) In: *Journal of Voice*.

### **Aerodynamics and motor control of ultrasonic vocalizations for social communication in mice and rats**

Håkansson, J., Jiang, W., Xue, Q., Zheng, X., Ding, M., Agarwal, A. A. & Elemans, C. P. H., Dec 2022, In: *BMC Biology*. 20, 1, 15 p., 3.

### **Bats expand their vocal range by recruiting different laryngeal structures for echolocation and social communication**

Håkansson, J., Mikkelsen, C., Jakobsen, L. & Elemans, C. P. H., Nov 2022, In: *PLOS Biology*. 20, 11, e3001881.

### **Driving singing behaviour in songbirds using a multi-modal, multi-agent virtual environment**

Larsen, L. B., Adam, I., Berman, G. J., Hallam, J. & Elemans, C. P. H., 2022, In: *Scientific Reports*. 12, 1, 13414.

### **One-to-one innervation of vocal muscles allows precise control of birdsong**

Adam, I., Maxwell, A., Rößler, H., Hansen, E. B., Vellema, M., Brewer, J. & Elemans, C. P. H., 26. Jul 2021, In: *Current Biology*. 31, 14, p. 3115-3124.e5

### **How Loud Can you go? Physical and Physiological Constraints to Producing High Sound Pressures in Animal Vocalizations**

Jakobsen, L., Christensen-Dalsgaard, J., Juhl, P. M. & Elemans, C. P. H., May 2021, In: *Frontiers in Ecology and Evolution*. 9, 15 p., 657254.

### **Syringeal vocal folds do not have a voice in zebra finch vocal development**

Maxwell, A., Adam, I., Larsen, P. S., Sørensen, P. G. & Elemans, C. P. H., 19. Mar 2021, In: *Scientific Reports*. 11, 18 p., 6469.

**Increasing Muscle Speed Drives Changes in the Neuromuscular Transform of Motor Commands during Postnatal Development in Songbirds**

Adam, I. & Elemans, C. P. H., 26. Aug 2020, In: *Journal of Neuroscience*. 40, 35, p. 6722-6731

**High-fidelity continuum modeling predicts avian voiced sound production**

Jiang, W., Rasmussen, J. H., Xue, Q., Ding, M., Zheng, X. & Elemans, C. P. H., 3. Mar 2020, In: *Proceedings of the National Academy of Sciences (PNAS)*. 117, 9, p. 4718-4723 6 p.

**An Intralaryngeal Whistle Using an Elaborated Structure Enables Song in Alston's Singing Mouse**

Smith, S. K., Hakansson, J., Frazel, P. W., Long, M. A., Elemans, C. P. H. & Phelps, S. M., 1. Mar 2020, In: *Integrative & Comparative Biology*. 60, Suppl. 1, p. E420 1 p.

**Author Correction: Vocal state change through laryngeal development (*Nature Communications*, (2019), 10, 1, (4592), 10.1038/s41467-019-12588-6)**

Zhang, Y. S., Takahashi, D. Y., Liao, D. A., Ghazanfar, A. A. & Elemans, C. P. H., 24. Feb 2020, In: *Nature Communications*. 11, 1, 1096.

**Vocal Motor Performance in Birdsong Requires Brain-Body Interaction**

Adam, I. & Elemans, C. P. H., 10. Jun 2019, In: *eNeuro*. 6, 3, 6 p.

**The return to water in ancestral *Xenopus* was accompanied by a novel mechanism for producing and shaping vocal signals**

Kwong-Brown, U., Tobias, M. L., Elias, D. O., Hall, I. C., Elemans, C. P. & Kelley, D. B., 8. Jan 2019, In: *eLife*. 8, p. 1-15 e39946.

**Vocal state change through laryngeal development**

Zhang, Y. S., Takahashi, D. Y., Liao, D. A., Ghazanfar, A. A. & Elemans, C. P. H., 2019, In: *Nature Communications*. 10, 12 p., 4592.

**Quantifying syringeal dynamics in vitro using electroglottography**

Rasmussen, J. H., Herbst, C. T. & Elemans, C. P. H., 23. Aug 2018, In: *The Journal of Experimental Biology*. 221, 16, p. 1-12

**High-fidelity fluid-structure interaction modeling of bird vocalization in syrinx**

Jiang, W., Xue, Q., Zheng, X., Rasmussen, J. H. & Elemans, C. P. H., 2018, *2018 AIAA Aerospace Sciences Meeting*. American Institute of Aeronautics and Astronautics Inc. (AIAA), 2018-0578

**The last common ancestor of animals lacked the HIF pathway and respired in low-oxygen environments**

Mills, D. B., Francis, W. R., Vargas, S., Larsen, M., Elemans, C. P. H., Canfield, D. E. & Wörheide, G., 2018, In: *eLife*. 7, e31176.

**In situ vocal fold properties and pitch prediction by dynamic actuation of the songbird syrinx**

Düring, D. N., Knörlein, B. J. & Elemans, C. P. H., 12. Sept 2017, In: *Scientific Reports*. 7, 14 p., 11296.

**Oilbirds produce echolocation signals beyond their best hearing range and adjust signal design to natural light conditions**

Brinkløv, S., Elemans, C. & Ratcliffe, J., 24. May 2017, In: *Royal Society Open Science*. 4, 5, 12 p., 170255.

**Fundamental frequency control in the songbird syrinx *in vitro***

Maxwell, A., Düring, D. & Elemans, C., 22. May 2017. 1 p.

**Plasticity in mitochondrial cristae density allows metabolic capacity modulation in human skeletal muscle**

Nielsen, J., Gejl, K. D., Hey-Mogensen, M., Holmberg, H-C., Suetta, C., Krstrup, P., Elemans, C. P. H. & Ørtenblad, N., 1. May 2017, In: *The Journal of Physiology*. 595, 9, p. 2839-2847

### **Fundamental constraints in synchronous muscle limit superfast motor control in vertebrates**

Mead, A. F., Osinalde, N., Ørtenblad, N., Nielsen, J., Brewer, J., Vellema, M., Adam, I., Scharff, C., Song, Y., Frandsen, U., Blagojev, B., Kratchmarova, I. & Elemans, C. P., 2017, In: *eLife*. 6, 20 p., e29425.

### **Motor control by precisely timed spike patterns**

Srivastava, K. H., Holmes, C. M., Vellema, M., Pack, A. R., Elemans, C. P. H., Nemenman, I. & Sober, S. J., 2017, In: *Proceedings of the National Academy of Sciences (PNAS)*. 114, 5, p. 1171-1176

### **Mice produce ultrasonic vocalizations by intra-laryngeal planar impinging jets**

Mahrt, E., Agarwal, A., Perkel, D., Portfors, C. & Elemans, C. P. H., 10. Oct 2016, In: *Current Biology*. 26, 19, p. R880-R881

### **Embodied motor control of avian vocal production**

Düring, D. N. & Elemans, C., Feb 2016, *Vertebrate sound production and acoustic communication*. Suthers, R. A., Fitch, W. T., Fay, R. R. & Popper, A. N. (eds.). Springer, Vol. 53. p. 119-157 (Springer Handbook of Auditory Research, Vol. 53).

### **Semicircular canals circumvent Brownian Motion overload of mechanoreceptor hair cells**

Muller, M., Heeck, K. & Elemans, C. P. H., 2016, In: *PLOS ONE*. 11, 7, p. e0159427 15 p.

### **Universal mechanisms of sound production and control in birds and mammals**

Elemans, C., Rasmussen, J. H., Herbst, C. T., Düring, D. N., Zollinger, S. A., Brumm, H., Srivastava, K., Svane, N., Ding, M., Larsen, O. N., Sober, S. J. & Svec, J. G., 27. Nov 2015, In: *Nature Communications*. 6, 13 p., 8978.

### **Multifunctional and context-dependent control of vocal acoustics by individual muscles**

Srivastava, K. H., Elemans, C. P. H. & Sober, S. J., 2015, In: *Journal of Neuroscience*. 35, 42, p. 14183-14194

### **The singer and the song: The neuromechanics of avian sound production**

Elemans, C. P. H., 2014, In: *Current Opinion in Neurobiology*. 28, p. 172-178

### **Vocal production complexity correlates with neural instructions in the oyster toadfish (*Opsanus tau*)**

Elemans, C. P. H., Mensinger, A. F. & Rome, L. C., 2014, In: *Journal of Experimental Biology*. 217, 11, p. 1887-1893

### **How the bat got its buzz**

Ratcliffe, J. M., Elemans, C. P. H., Jakobsen, L. & Surlykke, A., 2013, In: *Biology Letters*. 9, 2, p. 20121031

### **The songbird syrinx morphome: a three-dimensional, high-resolution, interactive morphological map of the zebra finch vocal organ**

Düring, D. N., Ziegler, A., Thompson, C. K., Faber, C., Muller, J., Scharff, C. & Elemans, C. P. H., 2013, In: *BMC Biology*. 11, p. 27

### **Superfast muscles are devoid of glycogen particles in the intramyofibrillar space**

Nielsen, J., Ørtenblad, N., Frandsen, U., Schrøder, H. D. & Elemans, C., 2012.

### **Superfast muscles are devoid of glycogen particles in the intramyofibrillar space**

Nielsen, J., Ørtenblad, N., Frandsen, U., Schrøder, H. D. & Elemans, C., 2012.

### **Superfast muscles set maximum call rate in echolocating bats**

Elemans, C., Mead, A., Jakobsen, L. & Ratcliffe, J., 2011, In: *Science*. 333, p. 1885-1888 4 p.

### **Walking the line: search behavior and foraging success in ant species**

Pearce-Duvet, J., Elemans, C. & Feener, D., 2011, In: *Behavioral Ecology*. 22, 3, p. 501-509 8 p.

**Smooth operator: Avoidance of subharmonic bifurcations through mechanical mechanisms simplifies song motor control in adult zebra finches**

Elemans, C., Laje, R., Mindlin, G. & Goller, F., 2010, In: *Journal of Neuroscience*. 30, p. 13246–13253

**Amplitude and frequency modulation control of sound production in a mechanical model of the avian syrinx**

Elemans, C., Muller, M., Larsen, O. N. & van Leeuwen, J. L., 15. Apr 2009, In: *Journal of Experimental Biology*. 212, 8, p. 1212-1224 13 p.

**Lynhurtig vokal gymnastik: Den neuromuskulære kontrol af fuglenes sang**

Elemans, C. & Larsen, O. N., 2009, *Carlsbergfondet. Årsskrift 2009*. Kyhn, G. (ed.). København, p. 14-21 8 p.

**Spectrogram analysis of mechanical events in sound production of animals**

Elemans, C., Muller, M. & Heeck, K., 2008, In: *Bioacoustics*. 18, p. 183-212 29 p.

**Superfast muscles control sound production in songbirds**

Elemans, C., Mead, A., Rome, L. C. & Goller, F., 2008, In: *PLOS ONE*. 3, p. e2581

**The biomechanics and neuromuscular control of vocalisation in a non-songbird**

Elemans, C., Zaccarelli, R. & Herzel, H., 2008, In: *Journal of the Royal Society. Interface*. 5, p. 691-703 12 p.

**Parasitic inhibition of cell suicide facilitates symbiosis**

Pannebakker, B., Loppin, B., Elemans, C., Humblot, L. & Vavre, F., 2007, In: *Proceedings of the National Academy of Sciences (PNAS)*. 104, p. 213-215 3 p.

**Modelling bird songs: Voice onset, overtones and registers**

Zaccarelli, R., Elemans, C., Fitch, T. & Herzel, H., 2006, In: *Acta Acustica united with Acustica*. 92, p. 741-749 8 p.

**Syringeal muscles fit the trill in ring doves (*Streptopelia risoria* L.)**

Elemans, C., Spierts, I., Hendriks, M., Schipper, H., Müller, U. & van Leeuwen, J., 2006, In: *Journal of Experimental Biology*. 209, 5, p. 965-977 12 p.

**Superfast muscles control dove's trill**

Elemans, C., Spierts, I., Müller, U., van Leeuwen, J. & Goller, F., 2004, In: *Nature*. 341, p. 146 1 p.

**Quantitative modelling of the biomechanics of the avian syrinx**

Elemans, C. P. H., Larsen, O. N., Hoffmann, M. R. & Leeuwen, J. L. V., 2003, In: *Animal Biology*. 53, 2, p. 183-193 11 p.

## Press clippings

**And forbløffer forskere ved at imitere bandeord og lyden af smækkende dør**

Coen Elemans

28/09/2021

1 Media contribution

**Australsk and forbløffer forskere ved at imitere bandeord og lyden af en dør, der smækker**

Coen Elemans

28/09/2021

1 Media contribution

**Bats have a better vocal range than Mariah Carey: Study**

Lasse Jakobsen & Coen P. H. Elemans

29/11/2022

1 item of Media coverage

**Bats have greater vocal range than Mariah Carey and growl like death metal singers**

Lasse Jakobsen & Coen P. H. Elemans

29/11/2022

1 item of Media coverage

**Cantar podría mantenerte atractivo, al menos si eres un pájaro**

Coen P. H. Elemans & Iris Adam

15/12/2023

1 item of Media coverage

**Daily vocal exercise is necessary for peak performance singing in a songbird**

Coen P. H. Elemans & Iris Adam

13/12/2023

1 item of Media coverage

**Daily vocal exercise is necessary for peak performance singing in a songbird**

Coen P. H. Elemans & Iris Adam

19/12/2023

1 item of Media coverage

**Death metal singers have a vocal counterpart ... in bats**

Lasse Jakobsen & Coen P. H. Elemans

04/12/2022

1 item of Media coverage

**Dolphins use 'Kim Kardashian voice' to help them hunt deep under ocean**

Coen P. H. Elemans

03/03/2023

1 item of Media coverage

**DR1 TV Avisen 18.30**

Coen Elemans

09/10/2019

1 Media contribution

**For toothed whales, sound production is all in the nose**

Coen P. H. Elemans

03/03/2023

1 item of Media coverage

**Forvildet hval gav unikke forskningsmuligheder**

Coen Elemans

21/12/2018

1 Media contribution

**Fugle og mennesker synger på samme måde**

Coen Elemans

30/12/2015

1 item of Media coverage

**Gopler har hukommelse og lærer hurtigt af deres fejl**

Coen P. H. Elemans

22/09/2023

1 Media contribution

**Hør selv! And har lært at imitere bandeord og en smækkende dør**

Coen Elemans

27/09/2021

1 Media contribution

**How do whales sing? Lab experiments suggest their voice boxes have a unique feature**

Coen P. H. Elemans & Magnus Wahlberg

24/02/2024

1 item of Media coverage

**HUGORMEN ER VÅGNET**

Coen Elemans

25/04/2021

1 Media contribution

**Hvalens strubehoved til SDU**

Coen Elemans

13/12/2018

1 Media contribution

**Kan man lave lyd med en død hval? Pukkelhvalen fra Skagen skæres op**

Coen Elemans

09/10/2019

1 Media contribution

**Kim Kardashian sounds like a whale (in a manner of speaking)**

Coen P. H. Elemans

03/03/2023

1 Media contribution

**Kontrolleret fuglesang**

Coen Elemans

18/08/2021

1 Media contribution

**Les chauves-souris, des chanteurs de death metal?**

Lasse Jakobsen & Coen P. H. Elemans

02/12/2022

1 item of Media coverage

**Les chauves-souris ont une meilleure voix que Mariah Carey**

Lasse Jakobsen & Coen P. H. Elemans

02/12/2022

1 item of Media coverage

**Magnus opnåede sin branches Oscar ved at undersøge død hval**

Coen P. H. Elemans

06/03/2024

1 Media contribution

**Magnus opnåede sin branches Oscar ved at undersøge død hval**

Coen P. H. Elemans

07/03/2024

1 Media contribution

**Mariah Carey's vocal range is better than most humans'. Bats surpass it.**

Lasse Jakobsen & Coen P. H. Elemans

01/12/2022

1 item of Media coverage

**mice sing**

Coen Elemans

10/10/2016

1 item of Media coverage

**Mus synger deres kærlighedssange i ultralyd**

Coen Elemans

04/11/2016

1 item of Media coverage

**Mystery of whale song unraveled by scientists, study says**

Coen P. H. Elemans & Magnus Wahlberg

22/02/2024

1 item of Media coverage

**Nu bliver sejhvalen skåret op - én ting springer i øjnene**

Coen Elemans

11/12/2018

1 Media contribution

**Ny opdagelse: Fugle og mennesker synger på samme måde**

Coen Elemans

29/11/2015

1 item of Media coverage

**Pas godt på hugormen, den er vågnet**

Coen Elemans

24/04/2021

1 Media contribution

**PRM / Sangfugle og computermodeller skal skabe øget forståelse af, hvordan mennesker producerer stemme og udvikler tale**

Coen Elemans

18/02/2021

1 Media contribution

**PRM / Sangfugle udviser ekstrem muskelkontrol, når de skal synge for hinanden (og dig)**

Coen Elemans

04/06/2021

1 Media contribution

**PRM / Sangfugle udviser ekstrem muskelkontrol, når de skal synge for hinanden (og dig)**

Coen Elemans

04/06/2021

1 Media contribution

**Pukkelhvalen fra Skagen skæres op**

Coen Elemans

10/10/2019

1 Media contribution

**Rivaler undlader at dræbe hinanden - de strækker bare hals**

Coen Elemans

21/06/2015

1 item of Media coverage

**Sangfugle og computermodeller skal skabe øget forståelse af, hvordan mennesker producerer stemme og udvikler tale**

Coen Elemans

18/02/2021

1 Media contribution

**Sangfugle synger på ekstrem muskelkontrol**

Coen Elemans

16/06/2021

1 Media contribution

**Sangfugle udviser ekstrem muskelkontrol**

Coen Elemans

07/06/2021

1 Media contribution

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06/06/2021

1 Media contribution

**Sangfugle udviser ekstrem muskelkontrol, når de skal synge for hinanden (og dig)**

Coen Elemans

04/06/2021

1 Media contribution

**Scientists discover how whales can sing under water and how shipping noise can disrupt communication**

Coen P. H. Elemans & Magnus Wahlberg

21/02/2024

1 Media contribution

**Scientists discover the anatomy behind the songs of baleen whales**

Coen P. H. Elemans & Magnus Wahlberg

21/02/2024

1 item of Media coverage

**Scientists discover the anatomy behind the songs of baleen whales**

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**Scientists discover the anatomy behind the songs of baleen whales**

Coen P. H. Elemans & Magnus Wahlberg

22/02/2024

1 item of Media coverage

**Sejhvalen skåret op - nu kender vi kønnet**

Coen Elemans

11/12/2018

1 Media contribution



**These Whales Still Use Their Vocal Cords. But How?**

Coen P. H. Elemans & Magnus Wahlberg

21/02/2024

1 item of Media coverage

**To hvaler strandet i Nordjylland er med til at afdække mysterium om hvalers sang**

Coen P. H. Elemans

21/02/2024

1 Media contribution

**Toothed whales use 'vocal fry' to hunt for food, scientists say**

Coen P. H. Elemans

03/03/2023

1 Media contribution

**- Vi stod nærmest klar med kniv og gaffel deroppe: Magnus opnåede sin branches Oscar ved at undersøge død hval**

Coen P. H. Elemans

04/03/2024

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**- Vi stod nærmest klar med kniv og gaffel deroppe: Magnus opnåede sin branches Oscar ved at undersøge død hval**

Coen P. H. Elemans

04/03/2024

1 Media contribution

**Whales 'cannot out-sing' human noise pollution**

Coen P. H. Elemans & Magnus Wahlberg

21/02/2024

1 item of Media coverage

**Whales can sing underwater without drowning—now we know how**

Coen P. H. Elemans & Magnus Wahlberg

21/02/2024

1 item of Media coverage

**Whale song mystery solved by scientists**

Coen P. H. Elemans & Magnus Wahlberg

22/02/2024

1 item of Media coverage

**Who's Using Vocal Fry in the Ocean? Dolphins and Whaaaaales**

Coen P. H. Elemans

02/03/2023

1 item of Media coverage

**Wie der „Gesangs-Apparat“ der Bartenwale funktioniert**

Coen P. H. Elemans & Magnus Wahlberg

21/02/2024

1 item of Media coverage

**Wie Wale Töne erzeugen**

Coen P. H. Elemans

17/04/2023

1 item of Media coverage

**Young women are criticized for this vocal tic — but it helps whales survive**

Coen P. H. Elemans

02/03/2023

1 item of Media coverage